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Civil Aspects of Defence

Earthquake Public Protection

Social Functions of Radio

United Kingdom Home Defence

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CIVIL ASPECTS OF DEFENCE

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In the compounding of strategy, there are three essential inputs, political, military and civil. Therefore, the development of any adequate defence posture requires a careful integration of political direction, military capability and civil potential. While in some countries authority for developing the civil potential is further sub-divided, in Canada it is treated as a whole with the obvious advantages of unified guidance and better coordination. This paper will deal with the civil aspects of defence which are taken to be all those Canadian defence matters which are neither political nor military. It will examine the nature of the problems which are generated by the requirements of a defence posture and the approach being taken in Canada to their solution.

Civil Problems in Defence

The civil problems in defence occur as a direct result of three basic requirements. These are the need for the population to survive as far as possible the impact of enemy weapons, the requirement to support the armed forces in their active defence functions and the need to meet commitments to allies. It would be appropriate to examine these briefly.

Effects of Attack

In the context of today's weapons the nuclear weapon is the most significant hazard to North America. It is true that this continent could be attacked with biological or chemical weapons, but only the nuclear weapon develops such a predictably high ratio of "result" to "delivery effort". In other words, from an enemy point of view its benefit-cost analysis is favourable. How many of these weapons might be directed against Canada is a matter of judgment; as is their potential yield. So, for the time being, it will be sufficient to say that nuclear weapons can cause staggering numbers of casualties and massive destruction, and so induce secondary and tertiary effects. Loss of manpower will affect production which in turn will affect the supply of essential commodities. Destruction of hydro-electric facilities will cause loss of power leading to an inability to pump water or sewage, to process food stuffs or to heat surviving accommodation. Destruction of oil processing facilities will affect transportation, heating and various types of industry. Residual radioactivity in many areas will temporarily inhibit productive work of any kind including agriculture. These are but a few examples of the vast number of inter-dependencies which exist throughout our civil and economic structure; enough, however, to illustrate that a nuclear attack on Canada will create gross imbalances between geographic regions, between supply and demand, and between the availability of resources and the ability to process them.

Support of the Armed Forces

The problem of supporting the armed forces now becomes apparent since the military machine can not function for very long unless it is geared to an even greater civil machine which will guarantee its needs in terms of manpower, of consumables and of material. It is sometimes argued that nuclear wars are fought with the logistic resources available at the outset, but this argument ignores two possibilities—one, that forces may be deployed and in action prior to a nuclear exchange, and two, that there may well be an increased need to preserve national sovereignty, or help ones allies to do so, after a nuclear exchange. Some part of the national civil effort must therefore be directed to the maintenance in being of whatever forces are necessary, and to providing them with the resources which will enable them to carry out their assigned roles.

Support of Allies

Collective defence obligations must also be honoured and while it is true that in any post nuclear strike period these can only be met to the extent that the capacity to do so survives, nevertheless, it is equally clear that some of our allies may be in more unfortunate circumstances than ourselves. So it is highly desirable that we strive to maintain a civil capability to participate in whatever collective arrangements may continue to be in our best interests.

Counter Measures

Since the fundamental civil problems stem from the effects of the delivery of enemy weapons on to Canadian (or adjacent United States) territory, counter measures seem to lie in three areas.

First is to prevent war, for which there are two possible methods. One is the removal of the causes and

occasions of war, a political activity to which the Government of Canada is dedicated. The other is deterrence, which is nothing more nor less, than inducing in a potential enemy the belief that he is unlikely to achieve his objectives at a cost which he is prepared to pay. It is the military defence forces which establish the costs which he must pay in terms of losses inflicted, and the civil defences which determine any additional effort he must make to overcome the effects of civil preparedness. Both, therefore, contribute to the state of deterrence.

The second counter measure is to minimize as far as possible the damage and casualties which can be caused by an enemy. Commonly referred to as "damage limitation" it has both military and civil components. Active defences, such as NORAD and anti-submarine defences, which can intercept, turn back or destroy enemy attack are examples of military measures, while dispersal of the population, radiological defence and shelters are comparable examples of civil measures.

The third counter measure is the mitigation of the effects of war both on people and on vital systems such as communications, transportation, utilities and government. Measures in this area are mainly civil and exist in the development of a national capacity to provide first aid, relief and essential services to people; and to repair, reconstruct, control and manage the basic and essential parts of our utilities and resource industries.

Practical Considerations

It would be unrealistic to continue this discussion further without introducing a number of practical considerations which exist. All defence measures, and hence those civil aspects with which this paper is concerned, must be subjected to an examination in which they are reviewed in the light of potential effectiveness, economic feasibility in terms of government and related expenditures, and political acceptability in the current international environment. Civil defence measures have yet another test which must be passed. This is their acceptability to the public, without whose support few civil measures can become effective. These factors are examined in the following paragraphs.

Potential Effectiveness

The days are long gone, if indeed they ever existed, when any active defence system could guarantee that there would be no enemy penetration. In the same way no civil defence authority can guarantee that any protective measure will be completely effective. Similarly, it is unrealistic to attribute to an enemy the ability to cause complete destruction and one hundred percent casualties. Looking at any plausible pattern of nuclear attack on Canada it becomes evident that neither the entire Canadian population nor all of Canada's civil institutions will be equally exposed to the resulting weapon effects. In fact, some will not be directly affected and will therefore survive without any protective measures; while others, in the vicinity of ground zero, may not be possible to protect.

Economic Feasibility

Consider a hypothetical diagram (Fig. 1) in which the horizontal axis represents the magnitude (or total capacity) of protective measures and the vertical axis, the cost of providing those measures. A second horizontal axis representing the percentage survival associated with various levels of the total capacity can also be used. It is interesting to realise that on this latter axis the point X is never zero. If, for example, we consider survival of the population, there is no Canadian study known to the author in which X is less than 50 percent.

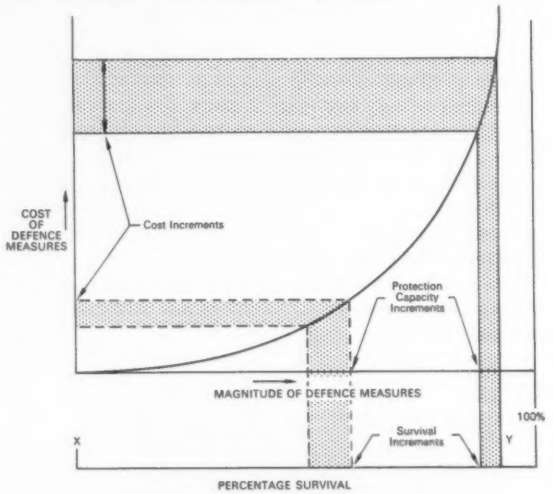

Figure 1

The graph itself has been drawn in hyperbolic shape to illustrate the fact that as one seeks higher survival rates the costs of the related defence measures rise slowly at first and then much more sharply, up to the point where it can be seen that no increase in expenditure is likely to increase the percentage survival beyond some theoretical maximum. The shape is also due to the recognisable facts that once a certain level of survival has been reached there will be a related cost of maintaining that level; and that no further increase in survival rates will occur unless and until additional finances over and above that cost are made available.

Whatever the cost of civil measures, it should be remembered that there is at least one major factor in their favour. They do not become obsolescent as rapidly as active defence measures. Generally speaking, civil measures are keyed to the effects resulting from the detonation of a warhead, whereas active defence measures must inevitably be concerned with the methods by which the warhead is delivered. It is a fact of modern weapon technology that delivery systems can be, and are, changed more frequently than warheads. Warhead sizes may be altered to increase the magnitude of their effect but the result of such alteration is to increase proportionately both the geographic area in which no protection is feasible and the area in which some civil measures would be necessary to ensure survival. It does not

alter the nature of the civil measures nor render them ineffective. In Fig. 1 the result would be to slide the Percentage Survival scale to the right, indicating that some additional expense would be necessary to obtain the same survival rate. This is a far cry from the costs of scrapping an expensive system for detecting, tracking, intercepting and destroying incoming weapons and substituting a new one every time a new method of delivery is developed. This, and the fact that in any active defence system a gap which is known to, or may be created by, an enemy renders much of the system in operative, are two of the reasons why various defence research institutes point out that, at the lower levels of defence expenditure a bigger return in terms of survival of the population is obtained by the preparation of civil measures, such as fallout shelters, than by other means.

A further factor concerns the national economy since a major goal of civil emergency measures is the transition, when necessary, of the national effort from peacetime objectives to defence oriented objectives. Clearly a major war involves the total resources of the nation, and equally clearly those resources have vastly different applications when meeting the needs of a beleaguered country to those existing in peacetime. For government departments, industry, trade, commerce and for services of all types, this transition from a peace to a war footing is one of the essential aims of war emergency planning. Today, the graduated response type of strategy currently receiving much attention makes it possible to contemplate this transition taking place by stages in which various emergency measures can be implemented in succession and at variable rates, although there are strategic scenarios, e.g. a sudden surprise attack, in which this approach is not possible.

The sum total of those measures implemented at any given time provides an indication of national readiness. The time taken to reach any level of readiness following a decision to do so is known as "reaction time". (Figure 2 illustrates an international emergency having four phases of increasing severity.) In moving towards various stages of readiness governments will be faced with a dilemma—the premature implementation of civil emergency plans which may well have harmful economic effects if the situation escalates more slowly than anticipated; or tardy implementation, especially in the latter phases, which could have catastrophic results. There is no magical solution. Decisions must stem from judgment based upon a full knowledge of the reaction time of each measure together with the possible consequences of implementation either too early or too late. The acquisition and analysis of this knowledge is a fundamental part of emergency planning.

Political Acceptability

Politically, defence measures are developed to provide a reaction to the threat. It is important, unless it is so intended, that these measures are not seen by other nations as the development of a fortified base strong enough to mount aggression or to upset whatever balance of mutual detererrence might exist. Having already discussed deterrence in terms of military and civil defence previously, it can be appreciated that civil measures, which inflict no losses at all on a potential enemy but do determine what incremental offensive resources he must deploy, are only likely to appear as an over-reaction to the threat when there already exists a relatively high degree of impenetrability in the military defences. In the absence of such impenetrability, and it must be remembered that the light ABM system does not provide it even for the U.S.A., let alone Canada, civil measures can only be seen as an effort to protect life and the essentials of life. It follows that the development of civil measures in Canada, known to the rest of the World as a country with only modest offensive capabilities and a policy strongly opposed to aggression, should not create markedly unfavourable reactions among other nations. Most nations recognise Canada's precarious position in any practice of "brinkmanship" between the major powers.

Public Acceptability

The acceptability to the public of defence measures is directly related to credibility. More than any other defence matters, civil defence measures become a matter of personal involvement. They are measures which individuals, as members of families, of communities, of industrial and commercial organizations or of governments must apply personally, and will be credible only on the basis of past experience, personal capacity, beliefs concerning the war environment which may evolve and

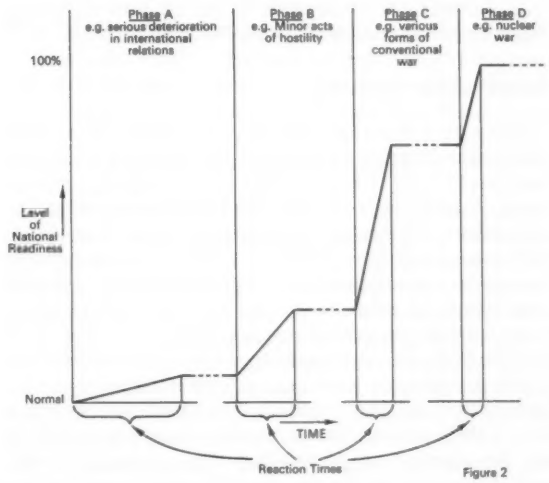

Figure 2

faith in leaders and colleagues. So, after having passed all the other tests, civil measures still have to be related to people's normal experiences and to be developed to the point where each individual's role is readily understood by him and believed by him to be possible. The limitations likely to be imposed by a war environment have to be made known in simple understandable terms

which are as accurate as possible and without emotional embellishment. Finally, the individual must be convinced that his leaders, and his peers are well versed in their emergency duties and fully intend to carry them out. There is nothing remarkably new in all this. These are the same steps through which any member of the forces or any corporate employee is conducted in his progress towards full effectiveness. So in themselves the steps do not constitute a problem. The problem lies in the fact that there are some 21 million Canadian who should be instructed but only few who can be exposed to any type of formal training.

Summary

Before turning to the solution of some of these problems it might be helpful to summarise them in general terms. It has in fact been indicated that the planner of civil measures for war must be guided by four requirements. The measures must be capable of leading to some degree of survivability or vulnerability reduction and mitigation of the after effects of attack. They must meet the test of economic feasibility and have a reasonable relationship of cost to potential-effectiveness. They must contribute to defence policy and to the strategic posture adopted nationally. Finally, they must be acceptable to the public and be capable of implementation while instilling confidence through realism and recognisable potential effectiveness.

Canadian Position

It should now be possible to review how Canadian plans stand in relation to these four requirements.

Potential Survivability

It is a fact that there are some 11 million Canadians living in and near to our major cities who, in the event of war, could be at risk to the direct effects of nuclear weapons. People living in rural areas in Southern Canada, especially in the prairies and Ontario, could be at risk to dangerous intensities of fallout radiation. For these individuals to survive they must be removed from the risk area (dispersal prior to attack), or they must be given some form of physical protection (shelter), or they must be afforded some combination of these (movement from highly dangerous areas to some form of physical protection in less dangerous areas). The ability to carry out any of these survival measures depends to a great extent on the physical characteristics—topographical, urban and structural—of the areas involved. If one considers each major Canadian city and the area to which its population could be dispersed as a single complex, no two complexes will be similar. Selection of the optimum blend of survival measures therefore devolves upon provincial and municipal authorities who expect and receive some federal assistance in making that blend.

Today, many major Canadian cities have developed traffic movement plans for the dispersal of citizens; and most corresponding "hinterlands", if one may thus name the areas into which populations might be dispersed, are developing reception plans for evacuees. In addition, a national survey of potential fallout shelter has been carried out by the federal government and a potential of some fifty million shelter spaces identified.

All this, however, is first phase planning which must be developed further. Movement of large masses of people incurs serious logistic problems. Not every "hinterland" is capable of accommodating the entire population of its associated city. Even if the "hinterland" could provide for all evacuees, it is generally true that the greater proportion of fallout shelter spaces are found in the large buildings of cities rather than in the rural communities of the "hinterland". Survival planning problems are further compounded by the fact that in the major cities there is no satisfactory way at present of providing mass protection against the direct effects of nuclear weapons. These considerations tend to force planners towards a decision for evacuation. However, this too is complicated by the impossibility of considering the complete shut-down of a city, except in the last few hours prior to a nuclear attack and by the impossibility of guaging the precise time of any attack sufficiently far in advance to be effective.

Second phase planning is underway at present. This involves balancing dispersal plans with the potential for reception and fallout shelter in the "hinterlands". In addition current thought includes planning to achieve by local dispersal a more uniform population density throughout major urban areas—a measure which could significantly reduce potential casualties. At the same time investigation is continuing into methods for evaluating the protection afforded against direct weapon effects so that some advantage may be taken of suitable major buildings and underground structures.

The third phase of planning, for which no authority exists at present, would be to take steps to increase the potential shelter and reception capabilities of the "hinterlands" and to develop plans for the use of available protection in the major cities against direct weapon effects.

With regard to the survivability of systems, Canadian planning has recognized the impossibility of guaranteeing the survival of any single installation or facility and has concentrated either on the development of alternate facilities or on the preparation of special emergency procedures. There is a complex of emergency headquarters in the Ottawa area from which the federal government can continue to operate. Similar arrangements have been, or are being made in the provinces. Energy distribution networks and communication systems are gradually increasing their ability to avoid potential areas of damage and certain industries have taken steps to establish an emergency location from which to operate and/or safeguard essential records. There still remains much to be done since, except for the continuity of government program which has been implemented and developed by the federal government, many of the measures taken by industries have resulted from their own appreciations of

the situation rather than in response to any unified coordination.

Planning in the industrial area should therefore provide some national coordination so that a degree of balance will be maintained between systems with fundamental interdependencies such as transportation and energy, industry and manpower, supplies and transportation, industry and energy and so on. The further development of the National Resources Data Bank which even today enables our national resources to be analysed by computer for any type of prescribed hypothetical attack will be increasingly valuable in the study of critical and significant components of the economic structure. Computer analysis can and will provide indications as to where some a ditional effort for survivability should be directed.

Economic Feasibility

Two questions of economic feasibility concern us. First, are the plans and preparations for the transition of our economy from a peace to a war time base practical and adequate? Second, is the cost of the entire national program within our financial capability?

Plans for the transition from peace to war envisage the establishment of a number of wartime agencies such as a War Supplies Agency with responsibility for controlling supplies, fuel and energy, prices and other related activities; a General Transport Controller with controllers for marine, rail, road and air transport reporting to him; a National Emergency Manpower Authority; agencies to control accommodation and emergency construction; and basic financial controls which will remain with the Department of Finance and the Bank of Canada. A great deal has been done in basic planning by those responsible for these agencies. The problem remaining to be solved in further planning stems from the fact that in nuclear war economic changes will occur suddenly, dramatically and catastrophically, and the normal slow and measured responses usually sufficient to counter-balance peacetime fluctuations will no longer suffice. Planning is therefore concentrating on mechanisms by which the situation can be assessed rapidly so that coordinated corrective measures can be implemented immediately.

Whether or not the costs of a civil emergency program are within our capability the reader must decide for himself. The current program costs approximately $14 million per annum or about 66¢ for each Canadian. Total defence spending is in the area of $88 dollars per Canadian per annum. The figures are not intended as an invidious comparison since, military expenditures are for the most part directed towards the provision of a capacity to maintain effective weapons in action, whereas civil emergency plans envisage the use of existing civil personnel, civil resources and civil organizations to perform the civil tasks in defence. Much of what is required is already in existence and can be used in war if plans and arrangements are well made and individuals well indoctrinated in their emergency roles. Of course, there are requirements for some systems not needed in peacetime. Examples are radiological defence, the warning system, and emergency communications, all of which have been provided for and are being maintained by the federal government through the civil emergency program.

Examination of the estimates presented to parliament will reveal that the civil emergency budget does not include funds for the provision of either fallout or blast shelters, so that if the public demands a shelter program then the allocation of funds would clearly have to rise above the present 66¢ per head level. It is neither possible nor useful to indicate by how much but, reverting to Fig. 1, every infusion of funds applied to a survival program such as shelters will increase the potential number of survivors. Apart from the fact that it is probably not practical to undertake a national program at anything less than $1 million a year, the amuont could be as much or as little as the government desires. The tendency to reach for a total program cost must be resisted for it would be meaningless. One should think rather in terms of increasing survivability by a series of annual increments until a viable capacity has been reached and can be maintained.

Similar arguments apply to the survivability of various civil systems and essential industries. Here we are concerned not so much with preserving intact an entire system as with the ability of the system to function at some percentage of its peak capacity. This is why emergency measures planning concentrates on mitigating those effects which could cause total breaks in a system rather than on "hardening" the entire system.

Contribution to Defence posture

To decide whether the civil aspects of our defence contribute to the Canadian defence posture we must go back to the major means of countering the effects of war which were discussed earlier in this paper. They were: keeping the peace, deterrence and mitigation of effects, the first of which is a political activity.

Deterrence included population dispersal, radiological defence, shelter and other damage limiting measures. It must be concluded therefore that, to the degree that Canadian defence policy embraces deterrence, civil measures now in existence are completely compatible and consistent. It can be argued that damage limiting civil measures have not been advanced far enough, but there is an equally valid counter argument which claims that a state of deterrence exists now and there is therefore no need to contribute further to it.

It becomes a vastly different matter however, if the deterrent should fail to deter. Under this circumstance, most damage limiting measures would serve to mitigate the effects of an attack and to increase the survivability of the nation. The addition of damage limitation to the nation-wide arrangements already existing for rescue, first aid and welfare services, and for repair and recovery, would result in a significant survival capacity. There are therefore those (including the author) who would

(*Continued on page 11*) **CIVIL ASPECTS**

PROTECTION OF THE PUBLIC FROM EARTHQUAKE HAZARDS IN CANADA

by
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The following article was written to attempt to put earthquake and tsunami hazards in Canada within a scientifically substantiated context of overall risk. It is apposite in view of the current interest by Civil Defence and Emergency Measures organizations in disaster warning and prevention.

The promotion of public safety from earthquake hazards is one of the objectives of many research scientists, engineers and public officials in Canada. Hazards from earthquakes may result from the severe shaking of structures or soils during the event, or may be due to the secondary effects such as tsunamis (seismic sea waves), landslides or fires. Improved public safety from these hazards may be increased by research programs and planning during periods between damaging earthquakes, by following carefully formulated plans during the time period when the earthquake activity is taking place, and by making detailed studies of the effects in the community immediately after the event.

Within the period between strong earthquakes, research programs can be conducted to guide community planners and design engineers in their attempt to provide for the public safety. A continuing program of research by seismologists within the Earth Physics Branch, Department of Energy, Mines and Resources, has indicated that there are areas within Canada where strong earthquakes, some of them damaging, have occurred. Geologists also confirm, with less exact dates, that earthquakes, or at least major tectonic movements, have taken place in Canada over many millions of years. The data show that Eastern Canada has experienced several severe earthquakes. The most recent major events were in 1925 in the St. Lawrence River near the mouth of the Saguenay River, and in 1929 on the Grand Banks, Newfoundland. The west coast of British Columbia has been severely shaken in 1918, 1929, 1946 and 1949. Each of these six earthquakes had a magnitude of 7 or greater. Large earthquakes also occur in Northern Canada.

Tables 1 to 3 list all the larger earthquakes up to mid-1972 which are known to have affected Canada. The magnitude, which is an instrumental measurement of the size of the earthquake, is listed beside each event. An earthquake with a magnitude of 5½ can cause considerable ground shaking near the origin, and one of magnitude of 6½ can cause major damage over a limited area. The threshold of significant damage is difficult to define, but is approximately magnitude 5. Earthquakes with magnitude 5½ have caused limited damage in the past in Canada, and a magnitude 5.9 earthquake at Cornwall, Ontario, caused two million dollars damage in 1944. In each case, the amount of damage at a specific location is a function of the magnitude, the soil type at the site, the distance from the source of the earthquake, its depth of focus and mechanism and the standards and quality of building construction.

The larger earthquakes of Tables 1 to 3 provide information concerning the regions which can be shaken, and

TABLE 1
EASTERN Canada Earthquakes (magnitude ≥ 6)

Date	*Location*	*Estimated Magnitude*
1663	Near the mouth of the Saguenay River, La Malbaie	7.5—8
1665	Near the mouth of the Saguenay River, La Malbaie	6.5
1732	Near Montreal	7
1791	Near the mouth of the Saguenay River, La Malbaie	6 —6.5
1816	Near Montreal	5.5—6
1831	Two earthquakes of about equal intensity occurred near the mouth of the Saguenay River, La Malbaie	5.5—6
1855	Near Moncton, N.B.	5.5—6
1860	Near the mouth of the Saguenay River, La Malbaie	6.5—7
1861	Near Ottawa	5.5—6
1869	Bay of Fundy	6 —6.5
1870	Near the mouth of the Saguenay River, La Malbaie	7
1897	Near Montreal	5.5—6
1914	Near Lanark, Ontario	5.5—6
		Instrumental Magnitude
1924	Near La Malbaie, Quebec	6.1
1925	Near the mouth of the Saguenay River	7
1929	Grand Banks, Newfoundland	7.2
1929	Aftershock of above earthquake	6.0
1935	Timiskaming, Quebec	6.2
1944	Cornwall, Ontario	5.9

TABLE 2

WESTERN Canada Ecrthquakes (magnitude ≥6.5)

Date	*Location*	*Estimated Magnitude*
1872	Probably lower mainland, east of Vancouver	7.5
		Instrumental Magnitude
1912	South of Queen Charlottes	6.5
1914	West of Vancouver Island	6.5
1918	Near Nootka Island, west coast of Vancouver Island	7
1920	Queen Charlotte Sound	6.5
1921	Off northwest coast, Queen Charlotte Islands	6.5
1926	West of Vancouver Island	6.5
1929	Two shocks—Queen Charlotte Sound	7, 6.25
1935	West of Vancouver Island	6.25
1938	Queen Charlotte Islands	6.25
1939	Off Vancouver Island	6.5
1945	Northwest coast, Queen Charlottes	6.25
1946	North Strait of Georgia	7.3
1946	Two shocks off northwest coast of Vancouver Island	6.5, 6.5
1948	West of Queen Charlottes	6.5
1949	Queen Charlotte Islands and aftershock	8.0, 6.4
1956	Two shocks south of Queen Charlottes	6.8, 6.5
1956	West of Vancouver Island	6.25
1956	Off northwest coast, Queen Charlottes	6.5
1957	West of Vancouver Island	6.8
1960	Queen Charlotte Islands	6.5—6.75
1970	Queen Charlotte Islands	6.5—7
1972	Near Nootka Island, western Vancouver Island	6.25
1972	West of Vancouver Island	6.25

TABLE 3

NORTHERN Canada (magnituce ≥6)

Date	*Location*	*Instrumental Magnitude*
1920	Beaufort Sea	6.5
1933	Baffin Bay	7.3
1934	Baffin Bay	6.5
1940	Northern Yukon—two shocks	6.25, 6.5
1944	West of Whitehorse, Yukon	6.5
1945	Baffin Bay	6.5
1952	South of Whitehorse, Yukon	6
1953	East central Yukon	6.5
1955	East central Yukon	6.5
1956	East central Yukon	6.5
1957	Baffin Bay	6.25—6.5
1957	East central Yukon	6.7
1963	Two shocks on Baffin Island	6, 6

the degree of maximum shaking. There are, in addition, many small earthquakes associated with each seismic zone which can be detected only by sensitive instruments. A study of all the events provides the seismologist with statistical parameters which describe the earthquake risk. Programs are available for calculating the frequency versus magnitude relationship in a seismically active region. Return periods of the levels of earthquake amplitudes at selected locations can be calculated (Milne and Davenport, 1969). The seismic zoning map in the National Building Code of Canada (1970 edition) (Figure 1) displays the results of these programs. The zone boundaries on the map are contours of statistically determined levels of earthquake acceleration amplitudes on average soils with a return period of 100 years.

Statistical studies of earthquake sequences can suggest where the tremors are most likely to occur, and how large the amplitudes may be. The design engineer, however, needs to know the distribution of amplitude within the frequency range of the earthquake and the time duration of strong shaking. Sensitive seismograph stations cannot provide these data because the amplitudes become very large at near distances.

Strong-motion seismographs normally do not operate until triggered by an earthquake which is strong enough to be felt. The magnification of the sensor, usually an accelerometer, is low so that large amplitudes can be read easily. To obtain engineering seismology information, arrays of strong-motion seismographs must be placed throughout a seismically active zone. The records are analyzed by standard methods to obtain spectra of the earthquake. Scientists of the Division of Building Research, National Research Council of Canada, operate a number of strong motion seismographs in Eastern Canada. The Earth Physics Branch of the Department of Energy, Mines and Resources has deployed strong-motion seismographs along the west coast of British Columbia and in the Mackenzie Valley. Private firms are also investing in these instruments to obtain a better understanding of the behaviour of the structures during an earthquake. The mid-1972, three accelerograph records have been obtained and analyzed in Canada (Milne and Rogers, 1971).

When earth scientists have determined the most likely areas where earthquakes will occur and estimated the characteristics of the design earthquakes in these areas, proper safety prevention measures can be taken in construction and land-use. The data described above are used as input to the seismic provisions in the National Building Code of Canada. The Code is a guide for public officials to legislate to ensure that earthquake-resistant designs are used in buildings within their jurisdiction. By following the Code, or other approved methods, engineers and architects can plan structures which will successfully resist the design earthquake and should not collapse if it is exceeded. Soils engineers can advise on the performance of foundation materials under the estimated earthquake load. Minor examples of unsafe practices, such as parapets, can be eliminated. On a broader scale, city planners can consider the problems of land-use in seismically active areas. An obvious planning recommendation should be that structures, particularly such crucial ones as hospitals and schools, must not be placed astride any active faults which can be identified, and that adequate precautions be taken in areas of poor soils.

These paragraphs have described in general how the direct effects of earthquakes can be reduced and the

public safety increased, but preparations can also be taken to reduce the secondary effects of the earthquake problem. Tsunamis, for example, are large sea waves which are triggered by earthquakes. They travel across oceans at great speeds (up to 500 miles per hour) and when they impinge on a coastline they can cause flooding and other damage. Tsunamis most often occur in the Pacific basin and are a threat to the west coast of Canada. Studies have been made to show that tsunamis are seldom, if ever, generated by earthquakes of magnitude less than 6.5, and frequently by the much rarer events with a magnitude near 8 (Iida, 1963). Mathematical models of inlets can provide information concerning the interaction between the inlet and a possible tsunami so that officials are aware of the most dangerous areas along the coastline. A search has been made of the records of the Tofino tide gauge by S. O. Wigen of the Marine Sciences Directorate, Environment Canada, to find which strong earthquakes have caused sea waves at this site. The authors appreciate Mr. Wigen's permission to publish this data, which is associated in Table 4 with the corresponding earthquake. There is obviously a need for some concern for the tsunami risk along the west coast of Canada, but the historical record shows that the probability of a damaging tsunami appears to be less than the probability of a damaging earthquake. Furthermore, the phase relationship between the rare tsunamis and the local tide governs their potential effect. White (1966) pointed out that the tsunami from the Alaskan earthquake of 1964 arrived at high tide at Tofino, and that previous to this occurrence only the tsunami from the Chilean earthquake of 1960 is known to have crested above the normal high water line at any place in British Columbia.

TABLE 4
Tsunami Heights on Tofino Tide Gauge, British Columbia

Daie	*Magnitude and Locaiton of Earthquake*	*Wave Height in Feet*
1912 Jan. 4	7.0 Aleutians (52N, 179W)	possible but no definite wave
1918 Sept. 8	8.2 Japan (45N, 151E)	0.5
1926 Oct. 13	7.1 Aleutians (52N, 176W)	possible trace
1946 Apr. 1	7.4 Aleutians (52N, 163W)	small (0.5)
1952 Nov. 4	8.2 Kamchatka (53N, 160E)	2
1960 May 22	8.0 Chile (38S, 73W)	4
1964 Mar. 28	8.4 Anchorage (61N, 147W)	8.1
1969 Aug. 11	7.8 Kurile Is. (43N, 147E)	0.1
Other uncertain possibilities—certainly less than 0.5 feet:		
1915 Nov. 1	7.7 Japan (39N, 142E)	
1918 Nov. 8	7.7 Japan (45N, 151E)	
1923 Feb. 4	8.3 Kamchatka (54N, 161E)	
1923 Apr. 14	7.2 Kamchatka (56N, 162E)	
1923 Sept. 1	8.2 Japan (35N, 140E)	
1933 Mar. 3	8.5 Japan (39N, 145E)	
1944 Dec. 7	8.0 Japan (34N, 136E)	

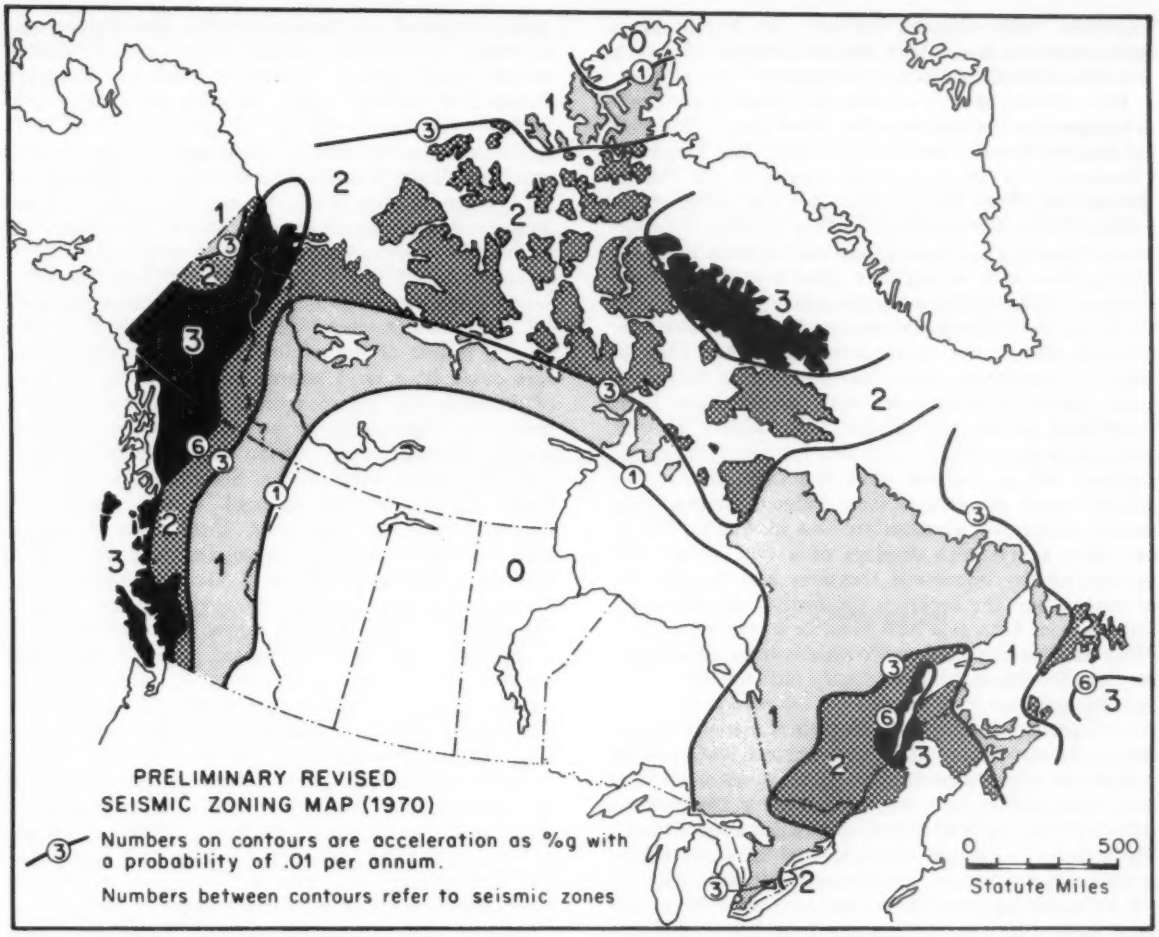
The implication is that the tsunamis which reach Canada's coast have generally originated at great distances and travelled across the open ocean to Canada. The north Pacific Ocean is one of the source areas, but the 1960 Chilean earthquake did produce some activity. Usually, these distant sources allow time for a warning to be distributed. There is some evidence, however, that the 1946 earthquake in the north Strait of Georgia generated small local sea waves (Hodgson, 1946). It appears that it would be prudent to undertake the necessary difficult research studies on the mechanism of the earthquakes along the coast of Canada in order to determine whether there is a sufficient number of tsunami-generating fault mechanisms to warrant implementation of a local warning system. Tsunamis are rare in the Atlantic Ocean. However, the 1929 earthquake on the Grand Banks, Newfoundland, in addition to its other damaging characteristics, generated a local tsunami which drowned 27 people in Placentia Bay, Newfoundland.

Closely related to the tsunami, which is a wave on the ocean caused by an earthquake, is the seiche. This is an oscillation of an enclosed body of water caused sometimes by the passage of seismic waves near the resonant frequency of the reservoir. The Cornwall-Massena earthquake in 1944 (Milne, 1948) caused some oscillation in lakes in the eastern part of the continent, and the Montana, 1959, earthquake caused a small seiche on Skaha Lake in Central British Columbia. Seiches are seldom damaging, but they can be an alarming phenomena to any observers.

The possibility exists that landslides which are caused by earthquakes can contribute to the hazard. The great Turtle Mountain slide in southwestern Alberta in 1903 appears not to have been related to an earthquake, but to local mining activity. There were two minor local earthquakes near the time of the Hope, British Columbia, slide in 1965 (Mathews and McTaggart, 1969). Hodgson (1946) reports that the British Columbia earthquake in 1946 triggered many landslides and in one case, at Comox Lake, a landslide came very close to causing casualties. Although most Eastern Canadian landslides appear to be completely untrelated to seismic activity, earthquakes in 1929 and in 1935 triggered important landslides. There are thus sufficient data to establish the fact that landslides can be a serious secondary effect of earthquakes. Those who plan cities, and other structures and communities, must be aware of this danger, and in consultation with soil engineers should avoid building on sites which can be in the path of a landslide. This is again a problem of land-use in an active seismic region. Effects on large reservoirs in earthquake-prone regions may also need consideration.

There is no Canadian experience on secondary fire hazard: any student of such earthquakes as the San Francisco earthquake of 1906 and the Kwanto, Japan, earthquake of 1923 will realize what a terrible problem this can potentially be following a disastrous earthquake in an urban area.

Between large earthquakes there is thus a need for measured, continuing research programs to study the phenomena, for communication of the results of the studies to engineers and planners, and for engineering


PRELIMINARY REVISED
SEISMIC ZONING MAP (1970)
Numbers on contours are acceleration as %g with a probability of .01 per annum.
Numbers between contours refer to seismic zones
0
500
Statute Miles

advances which will reduce the damaging effects of earthquakes with minimum economic penalty.

During the time period immediately following an event, planned action can again reduce the danger to the general public. There is a need for a rapid means of locating the epicentral area and magnitude of the earthquake. The civil emergency planners and the seismological organizations collaborate on this by comparing macroseismic or the observed strong-motion effects and instrumental data. Such a plan of communication does now exist in British Columbia between the Provincial Civil Defence office in Victoria and the regional network of seismographs operated from the Victoria Geophysical Observatory.

When the magnitude of the event is very great, the regional network seismographs may become overloaded, and data must be obtained from some of the other 28 or so seismic stations positioned throughout Canada by the Department of Energy, Mines and Resources. At the present time, rapid exchange of data is by telephone communication between operators of of seismic stations, but plans are being made to telemeter seismic data from a small number of sites to central offices in Victoria and Ottawa to speed up the process. Even this will not be a 24-hour per day operation. To offset the problem of an earthquake occurring outside office hours, temporary seismographs have even been placed in the basement of a siesmologist's home in Victoria to provide immediate data and to cut down the reaction time after a major shock. In addition, the seismologist may need to estimate the likelihood of aftershocks, their strength, and issue judgements on these probabilities in order to satisfy the public demand for reassurance.

The civil emergency planners, the Emergency Measures Organization at the Federal level throughout Canada, and the provincial organizations such as the Civil Defence organization in British Columbia, assume responsibility for the problem one the epicentral area has been identified, and a rough assessment made of the extent of the damage. However, it is, again, necessary to have very close collaboration between the civil emergency organization and groups upon which it can call for expert advice, such as geologists, structural

engineers, water resource engineers, etc. In fact, some prior planning is a highly desirable aspect of coping with the earthquake disaster problem.

International groups are also interested in the rapid determination of earthquake epicentres. Designed specifically for the tsunami problem, the Honolulu Observatory is the operations centre of the Pacific Seismic Sea Wave Warning Service. This office of the United State Government gathers seismic readings from observatories around the Pacific Ocean to locate earthquakes with magnitudes great enough to cause tsunamis. The Victoria seismograph station of the Department of Energy, Mines and Resources has contributed data to this centre since 1961 when Canada began to participate in the warning system. In recent years special observatories with arrays have been established aroung the Pacific Ocean with a 24-hour watch, and the number of requests for data from single stations such as Victoria have decreased. One of the seismic arrays is operated from Palmer, Alaska, with sensors along the Aleutian arc and in Alaska. There are other arrays with displays of a type which will provide nearby immediate locations and magnitudes of earthquakes, the Berkeley, California, seismographs, for example. Thus it is now possible to rapidly obtain data related to any earthquake which can cause damage in Canada either from regional, national or international sources.

The strong local earthquake will cause immediate damage in the epicentral region. There is no warning system which can alter this, or protect persons at this time, beyond the protections afforded by compliance with the National Building Code, as discussed earlier. The landslide will have been triggered instantaneously as well, if it is to occur. The tsunami, if it is to happen, will be beginning its traverse across the water to coastlines. Here a warning system can be a very important part of public safety. The warning system around the Pacific as it currently applied to Canada is described in an earlier article in **the EMO National Digest** Vol. 12, No. 1 (Erb and Wall, 1972). After some initial problems with the dissemination of warnings in Canada, the office of British Columbia Civil Defence assumed this responsibility. In addition to the procedures described, there is a considerable amount of Canadian scientific input in the action, such as seismic readings, advice about amplitudes and travel times of sea waves and readings from tide gauges. The Marine Sciences Branch of the Department of the Environment has operated a tide gauge at Tofino, British Columbia, for many years. This gauge is an integral part of the Pacific warning system, and can now be interrogated by telephone directly from Honolulu. In addition to these permanent gauges, the tidal scientists are acquiring the capability to set out temporary tide gauges rapidly in some of the inlets along the coast to make observations of the water action during the period of a tsunami.

The above plans relate to the unexpected event, the natural earthquake. There are times when civil emergency personnel and scientists can man special programs to watch for possible seismic danger from expected events. Many groups considered that the Cannikin exercise, a United States large-yield underground nuclear explosion in the far Aleutian Islands in 1971, might conceivably, even if improbably, trigger a tsunami-generating earthquake, or even an earthquake in a place remote from the explosion. The Pacific Seismic Sea Wave Warning System was activated at this time and the communication within the system is described by Erb and Wall. There was, however, a very extensive scientific effort in Canada to observe the event and to warn of anything unusual in the seismic record of the explosion. The unusual in this case could be a large natural earthquake at the time of the explosion, an unexpected catastrophic tsunami-generating earthquake or a small local event which would, because of its timing and association with Cannikin, cause some alarm. Seismologists from the Earth Physics Branch manned several special instrument sites at this time throughout northern British Columbia and the Yukon Territory. This array and the permanent stations at Victoria, Yellowknife and Ottawa were coupled by telephone lines. When the explosion was recorded, travel times, amplitudes, magnitudes, etc., were compared to show that the explosion behaved exactly as predicted, without adverse seismic or tsunami effects on Canada. The possibility also existed that the Cannikin explosion could cause a tsunami. Scientists from the Marine Sciences Branch set out temporary tide gauges at vital locations such as the Alberni Inlet and the Queen Charlotte Islands (under extreme weather conditions). Thus, a system of the Departments of Energy, Mines and Resources and Environment did exist in Canada to detect, to record and to warn of any danger from Cannikin.

Once a strong earthquake is over, there is a final period when further protection of the public is necessary The civil emergency officials, with public safety in mind, must keep people away from dangerous areas. They will need to get the essential services of the community functioning in a normal manner, and will need to assess the damage to certain structures to determine whether they are safe for re-entry. There is also an imperative need for cooperation between the scientist, the engineer and the civil emergency officer. The seismologist must be able to collect the strong-motion records in the epicentral area. Observations must be made of the evidence of the earthquake, such as ground breaking, soils performance, structural damage or performance, changes in water depths at coastal communities, and even human behaviour. The observations can be applied to make improvements as required so that the next earthquake will be less damaging. Some planning beforehand seems needed so that the civil emergency official, the seismologist, the engineer, the geologist, the hydrographer, etc., can be aware of the interests of others at this time and can work effectively as members of a team. ▲

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CIVIL ASPECTS (*Continued from page 5*)

wish to see some authority for the development of a shelter program and for the introduction of damage limiting measures in some of our key utility and industrial systems.

To sum up, therefore, if one believes the deterrent to be infallible, then the civil aspects of our defence are entirely consistent and compatible. If, however, one believes that some day the deterrent might fail, then, although the civil planning and preparations are moving in a consistent direction, the rate of development is not compatible with the risks which would be involved.

Public Acceptability

The basic factors upon which public acceptability are based were discussed earlier; and plans and programs exist to educate the public in peacetime and to keep it informed in war. The people have in the past been quick to detect inadequate or impractical plans and, for a number of years now, all civil emergency organizations have been working to eliminate these. The result has been an expanding credibility in the effectiveness of emergency planning; a credibility which has been greatly enhanced by the excellent performance of an increasing number of communities which have had to put their emergency plans into effect during various types of peacetime disaster. Generally speaking the public does not wish to be disturbed by high pressure indoctrination, but it does expect its leaders to develop plans for emergencies and it does view them critically when they come into the limelight. Good performance inspires confidence, establishes credibility and confirms the acceptability of the arrangements. The potential tasks for community leaders are therefore made so much lighter.

Conclusion

The civil problems in defence are immensely complex and spread over the entire structure of the nation. Plans and preparations designed to solve the problems involve not only the development of machinery to enable the peace to war transition to be carried out smoothly but also the acceptance of emergency roles by practically every citizen and organization within Canada. At the same time arrangements have to be made to ensure the maximum possible survival of people and of essential systems. Despite this, that which is possible has a practical ceiling which is fixed by economic considerations, by the potential effectiveness of emergency measures, by their contribution to the defence posture and by their general acceptability. These matters are so related to the political and military aspects of defence that really effective planning for total defence is only possible when it is closely coordinated at the highest possible level.

Measured against all the desirable features of an ideal civil program for defence Canada falls significantly short only in the provision of shelters and in other damage limiting preparations. Whether this is a seriosu shortcoming or not depends upon how the future of deterrence is viewed—as a delicate balance indefinitely maintained? or one that some day may be upset? If one accepts the former view, Canada's civil emergency preparations have moved slowly but surely in the right direction although certain areas of planning remain to be further developed. If, however, the latter view is favoured, then there remains much to be done in the field of vulnerability reduction and damage limitation, all of which would necessitate some further allocation of funds to the civil aspects of defence. ▲

THE SOCIAL FUNCTIONS OF RADIO A COMMUNITY EMERGENCY

by
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and
Lyndsay Green
University of Toronto

The research on which the present report is based was made possible by grant No. 71-1005 awarded to the principal investigator, Benjamin D. Singer by the Canada Council. In addition, CFPL Radio (London, Ont.) provided an unrestricted publication grant to aid in preparation and publication.

"The Social Functions of Radio In a Community Emergency" is to the best of our knowledge the first study of its nature ever done. The principal investigator became interested in the way in which radio stations became the central coordinating forces in London during the great blizzard and arranged to get access to long playing tapes of CFPL covering most of that period. A search of the literature and consultation with experts at the Disaster Research Center at Ohio State University failed to turn up any relevant literature. Any gaps or deficiencies in the present report, therefore, hopefully will be made up in the future as other investigators follow up in this area and work toward building a substantial literature treating the subject of communications during community emergencies.

London, 1972 **Benjamin D. Singer**

INTRODUCTION

Some writers have described society as essentially a set of communications patterns: transactions in which information and meaning are transmitted between individuals and organizations. The media by which these transactions occur may be interpersonal channels, paper, technologically assisted interpersonal channels such as the telephone or mass media, etc. While it is difficult to observe all of these communications processes occurring simultaneously in a community, there are times when—as during an emergency—all other processes and channels become supplanted by one dominant medium which makes it possible to see with great clarity virtually all that is taking place. During the Great Blizzard in London, Ontario in 1971 such a transformation took place, causing time to become compressed, space condensed and psychological environments to shift from that which was diffuse and distant to that which was concrete and close to home. One develops, in a sense, an ecological portrait on the city during such a process.

On Tuesday, January 26, 1971, London, Ontario suffered one of the worst blizzards in its history. During the first 24 hours of the storm alone, 16 inches of snow fell, creating snowdrifts of up to 12 feet in depth. Ultimately, during the storm 24 inches of snowfall was recorded, earning the blizzard, according to some, the record for the worst storm in a quarter century. Winds of 100 miles per hour hurled across Lake Huron, visibility diminished to eight feet or less, with temperatures as low as 15 below zero. A nurse in a neighbouring town attempted to walk home from her hospital job, and froze to death en route.

The streets soon became totally unusable for vehicular traffic, with hundreds of cars stalled and abandoned on London's major streets. Army equipment had to be called in to aid in clearing streets as the mayor of London declared a state of emergency. Thousands of school children were stranded for as long as two days in the area's schools, unable to get transportation out and medical supplies, food, blankets were taken to the schools by emergency vehicles. The premier of the province himself was stranded at a service station on Highway 401 for 25 hours.

It was in this setting, with the city paralyzed, that London's radio stations began their emergency operations. All three, CFPL, CKSL and CJOE operated on an "open line" basis and handled thousands of telephone calls and messages. Of the three, CFPL has by far the largest audience and the best established open line program and thus we have chosen to focus our attention on its operations during the emergency.

Until 2:30 p.m. on Tuesday, January 26, 1971 CFPL broadcast as usual. At this time the decision was made to turn all programming into an "open line show." The announcer stated that the radio station would attempt to function as a 'go-between' and anyone who had something of an emergency nature to relate was asked to call

the station. At 3:37 p.m. it was decided to simulcast on both A.M. and F.M. frequencies. It was also decided to retain the daytime frequency pattern which usually must change at sunset in compliance with a Department of Communication regulation. The resulting radius reached by the transmission was 80 miles, serving even Stratford which receives poor A.M. signals from this particular station at the best of times. The "open line" format continued until 10:30 p.m. both Tuesday and Wednesday evening. Normal broadcasting was resumed Thursday, January 28th at 10:00 a.m. Only a fraction of the total calls received were aired; radio personnel estimated that in two days the radio station received 25 thousand calls or an average of 9 calls per minute.

Radio, at this time, mirrored the important concerns of the population, providing us with a sociology of everyday life. But it did not merely reflect the changed environment within which it was operating: it became an actor in the drama. Not only did it continue to provide information and entertainment but it took on the added role of moral authority and decision maker for an entire population. It recommended behaviour, gave advice, served as a source of assurance; besides providing general mass information, it served to transmit personal messages between individuals, it relayed messages for institutions wishing to speak to the general public, it linked resources with actual needs and became very much like a control centre.

Two central perspectives emerge from a study such as this one. First, we glean a macrocosmic picture of society as communications, in a state of flux, filtered and channeled through the primary medium during the emergency, radio; and the second involves an assessment of the dynamic role played by such a medium in aiding the community to cope with its changed environment.

METHODOLOGY

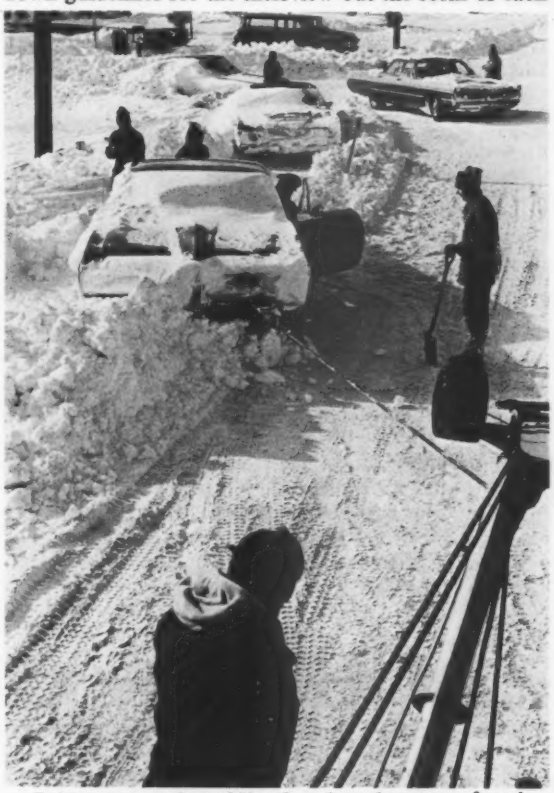
Emergency Operation

CFPL's broadcast tapes from Tuesday, January 26 through Thursday, January 28, 1971 were made available by the radio station for purposes of this study. The time span analyzed began at 1:30 p.m. on Tuesday and ended at 10:30 a.m. on Thursday. The portion of the tapes that were coded comprised a total air time of 30½ hours. A section of the broadcasting tape, comprising 14 hours from 3:00 p.m. on Wednesday to 6:00 a.m. of the following day, was not available for coding and hence does not constitute a part of the data.

The tapes were listened to by a researcher who transformed the calls into a coding scheme. The digital codes assigned to each call were then transferred on to IBM computer cards. Each unit of analysis is either a message from the announcer to the public (Output) or a phone call to the radio station (Input). The completed data comprised 1152 cards. Analysis of the data included frequency distributions and cross-tabulations computed on the PDP-10.

Each call was coded as to both day and time of day. It was noted whether the message was input or output i.e. relayed by radio personnel or phoned-in from the community. The caller's sex was recorded if the call was input. The source of the call or message was noted. Representatives of organizations identified themselves before relaying their messages and those who were not representatives were coded as 'individual'. The intended receiver of the call was recroded. Messages were directed at special groupings of individuals, at previous callers, to the general public or specifically to the radio announcer. The purpose of the actual message was recorded as well as its substantive content (i.e. the topic under discussion).

Follow-up interviews were conducted with the major institutions that had had contact with the radio station during the storm. A semi-structured questionnaire set down guidelines for the interview but the form of each



Before many roads could be plowed, workmen were forced to dig abandoned vehicles from snowbanks. Police and Canadian Forces personnel checked hundreds of cars for possible occupants.

interview varied according to the particular institution. The interviews were carried out either on the telephone or in person.

Open Line

For purposes of comparison CFPL's regular call-in radio program "Open Line" was analyzed in terms of its content and function. This program is aired daily except Sundays from 6:30 a.m. to 10:30 a.m. A sample frame of 3 consecutive days was selected at three points during the year. The time periods were summer and fall of 1970 and winter of 1971. Each call was coded using a coding scheme comparable to that used for the emergency operation data.

RADIO MIRRORS THE COMMUNITY BEFORE AND DURING THE STORM

We are normally unaware of much of the operation of the city during calm times as everyday patterns of transactions take place. And during normal times the calls to the radio open line are without a sense of immediacy as individuals call to discuss social problems, lost dogs, politics and recipes. Table 1 indicates the subjects of calls before the storm.

TABLE 1

Topics of Concern and Comparison
(Input and Output)

Topic	*Open Line*	*Emergency Operation*
	%	%
Transportation	10.0	31.9
Matters of Health, Welfare and Safety	8.7	20.5
Educational Institutions	1.6	13.8
Communication	7.0	9.9
Municipal Services	—	7.0
Business Firms	—	6.8
Recreation	18.7	6.8
Consumer goods and Services	6.4	2.0
Political and Legal Institutions	19.1	—
Social Problems	17.5	—
Miscellaneous	11.1	1.5
Total	100.0	100.0

As can be seen in the table, after the blizzard transformed the city, there was a corresponding shift in the kinds of issues brought to the open line show. There was a psychological shift from the abstract to the concrete; there was a concomitant temporal shift, for an emergency forces individuals to be concerned with the "here and now" and minimizes the amount of energy expended on future speculation. Localism prevails as a spatial shift occurs, from issues of international and national concern to those occurring at the community's own doorstep. Each of the subject shifts is examined below in turn.

Transportation

During normal times, transportation is the subject of 10 per cent of calls as people call to get information on bus routes or protest the name "Macdonald-Cartier Freeway", or ask about license restrictions. However, during the storm, calls dealing with transportation became the leading topic of the show, increasing to nearly 32 per cent of all calls. This is understandable because major arteries into London were blocked by drifting snow or abandoned cars, the railway tracks were impassable, causing the CNR to halt operations. No buses left London on Wednesday, the second day, and all Air Canada flights were cancelled. The London Transportation Commission removed all buses from the streets. Transportation for urgent matters was provided by snowmobiles, army half-track vehicles and other special equipment. In fact, the road condition was the single topic mentioned with the greatest frequency throughout the special radio operation, with almost ten per cent of all calls focused on this issue.

Another seven per cent of calls concerned travel behaviour, out-of-towners were advised to find accommodations in town; all without urgent business were asked to stay in their homes.

Health and Welfare

Normally, eight per cent of all calls deal with health and welfare topics. However, during the blizzard this figure jumped to 20 per cent. During normal times, radio is a sounding board for social comment on abortion or health legislation; during the storm, the calls were concerned with the need to cope in such a way that loss of life could be kept to a minimum. A man, for example, needed insulin urgently and the message was broadcast; three mothers-to-be got emergency transportation to the hospital. An expert phoned in to provide potentially life saving advice on heating systems; area groups phoned to announce the generation of emergency organizations to help in health and welfare matters.

Education

Ordinarily few calls (less than two per cent) deal with education, and when they do, the concern is usually with school board policies, or perhaps a teachers' strike or the issue of paddling. During the storm however the transactions dealing with education jumped to 14 per cent of the total. The concern was not for education in the abstract but for children and staff marooned in the schools. The school board, parents and school staffs maintained constant communication via the radio program throughout the storm. Much of the content dealt with the necessity of billeting children at schools and in neighbouring houses and providing them with supplies.

Communications

Normally, the focus of communication topics is on the substantive content of the media, the "message," if

(Continued on page 16)

EMERGENCY OPERATION PLAN

Call or Tune to

in
time of
Emergency

May, 1972

INTRODUCTION

This CFPL Emergency Operations Plan is intended:

1. To define the various types of emergencies that might occur, either internally or throughout CFPL's broadcast community.
2. To provide positive guidance for staff in any emergency.
3. To establish clearly defined authorities, responsibilities, and procedures.
4. To provide outside organizations with an understanding of our capabilities in the event of a major problem, and to permit the integration of our facilities with the City of London master plan.

CFPL-AM Radio is the only local broadcast facility with emergency sources of power.

In the event of a major problem, we might well be the only link between the public at large, and the various services available to them.

This responsibility can only be fulfilled if CFPL's staff follows their instructions specifically, and if we are able to continue to broadcast.

We are an integral part of the total Emergency Measures Organization. *We must stay on the air.*

A definition of the types of emergencies that might occur:

1. Any emergency involving the health and security of CFPL Radio's employees while operating in a normal way from our York Street facilities. **Page 3**

2. Any emergency which results in a loss of power to our studios or transmitters. **Page 5**

3. Any emergency which results in our having to vacate our York Street studios. **Page 6**

4. Regardless of our broadcast location, how we conduct ourselves in the event of a Local or Regional Emergency. **Page 8**

5. Regardless of our broadcast location, how we conduct ourselves in the event of a National Emergency. **Page 11**

EMERGENCY — TYPE 1

Action to be taken in the event of an emergency involving the health and/or security of CFPL Radio employees while operating in a normal manner.

In view of the fact that CFPL and the people involved with it are an integral part of the overall complex of The London Free Press Printing Company Limited, we are instructed to follow their procedures in the event of either:

A. Sickness or accident involving an individual

or

B. The security of the staff generally.

A. Should an individual become ill or have an accident, on the premises, the Radio Sales Department secretary will be alerted immediately.

1. She will call Thames Valley Ambulance immediately.
2. She will call the next of kin immediately and request the family doctor to arrange for the reception of the employee at Victoria Hospital.
3. She will advise the Personnel Department immediately.

4. Should emergency care be required to stop bleeding, etc., before ambulance arrives, she will obtain necessary material from first aid kit - and - will ensure the kit is maintained as specified at all times.

B. Should the security of the staff be threatened by a telephone threat:

The switchboard operator will remain calm and record as much information as possible on the Security Threat Check list which is attached as Appendix "A".

The operator will sign the Check List and turn it over to the Manager or his appointed alternate, or after regular office hours to the News Editor on duty.

No news of such a threat will be released by anyone. The Manager or his appointed alternate, or the News Editor on duty, will immediately advise Security Services, and await their instructions.

C. Should the security of the staff generally be threatened by an actual fire, or any other emergency:

The Manager or, in his absence his appointed alternate, or the News Editor on duty, will advise the Security Officer on duty, and will then await his instructions.

When the Manager, or his alternate, or the News Editor is instructed of any subsequent action, all staff are to accept his authority and act accordingly.

Should it be necessary to evacuate the building, we will act as per instructions regarding Emergency - Type 3 as outlined on Page 6.

No action, other than the reporting action set out above is to be taken, until ordered by Security Services, or a Personnel Department representative.

EMERGENCY — TYPE 2

Action to be taken in the event of loss of hydro to our studios on York Street, or to our transmitters.

A. *Loss of hydro to our studios or AM. transmitter:*

Loss of hydro is really not a major problem.

If hydro is lost in our studios, the Program Manager will be responsible for opening the panel on the rear of the tape machine racks in both AM and FM Master Control, and plugging in desk lamps which he has in his possession for this purpose only. In the evenings, the News editor-announcer on duty will be responsible for this action.

Three Emergency battery operated lights are also in the possession of the Program Manager for use at the switchboard and in the News Room.

Our generator will cut in automatically and feed power to all studios, so that equipment will continue to function and lighting will be available. This is a natural gas generator and should function indefinitely. Should the gas supply be cut off, we will move as per instructions on Page 6.

A loss of power at the AM transmitter will activate the generator there - however, a loss of power at our FM transmitter at TV will mean FM will be off the air.

The resident technician at the transmitter will be advised of the power problem and it is his responsibility to ensure an adequate on-going supply of fuel for our generator at the transmitter.

EMERGENCY — TYPE 3

Any emergency which causes us to vacate our York Street studios. This procedure covers only those situations where we alone have a problem, which is not the result of a broader emergency.

We might be forced to vacate our studios because of physical damage to the building, or as a result of the loss of our phone lines to our transmitters.

In the case of CFPL-FM, we would simply go off the air temporarily, advising listeners we were doing so. The Program Manager will alert the engineering staff at TV. They will arrange to pick up our AM signal from a normal radio receiver and put FM back on the air simulcasting our AM programming.

A decision to vacate the building can only be made by the Station Manager or his alternate, or by the News Editor on Duty if the above cannot be reached.

Once a decision is made, the Program Manager will arrange to move the mobile unit to the AM transmitter site and operators and announcers will perform as scheduled normally from the unit. The Program Manager will ensure he has microphones, a tape machine, and music will be provided from tapes prepared in advance for the purpose. He will immediately order a Bell program line from the transmitter to Wellington Road Holiday Inn and when installed will move the mobile unit to the Holiday Inn.

Open Line and Night Line will be discontinued and we will involve ourselves in straight music programming.

An office switchboard will be installed in half a day by The Bell Telephone Company at the Wellington Road Holiday Inn and will be manned by the normal staf.

The Administrative staff and the Sales Department will move into quarters at the Wellington Road Holiday Inn and will function as normally as possible with the Sales Representatives acting as couriers to provide live copy to the announcers.

The News Department will move to the Wellington Road Holiday Inn and will use our telerecord number and our Open Line number for the reception of telephone news reports. An emergency line to Contemporary News will be activated. Other wire copy will be picked up from CFPL Television. All newscasts will have to be "live" without the benefit of voice inserts.

If emergency were going to be extended beyond 48 hours, we could consider feeding news to FM at TV site, having an FM receiver at the AM transmitter and getting to air in that manner.

All of these instructions contemplate a situation which might last for a maximum 48 hours. If the emergency is such that we will be displaced for an extended period, it will be the responsibility of the Engineering Staff to establish facilities elsewhere, from which we could function in a more normal manner.

EMERGENCY — TYPE 4

Action to be taken in a Local or Regional Emergency.

A local or regional emergency is most apt to result from a severe storm, flood, rail or road accident involving dangerous cargos or a massive power failure.

The Station Manager or his alternate are the only persons authorized to declare a state of emergency. He will decide whether it is an isolated or a general emergency.

A. In the case of an *isolated* emergency, we will maintain normal programming, and cover the emergency by a news team using portable transmitters and the mobile unit.

   If our coverage of such *isolated* emergency would be hampered by our night pattern, we will use our daytime pattern for the duration of the emergency.

   The decision to use the daytime pattern, and the amount of air time to be devoted to the emergency will be at the discretion of the News Director, only after the Station Manager or his alternate has declared that the situation is in fact an *isolated emergency.*

   In the event that information with respect to an isolated emergency first comes to our attention through our news services or "Open Line" shows, the News Director will alert the City Clerk immediately.

   If any outside community is involved, the Mayor or Reeve of such community will be advised.

The City Clerk or Mayor or Reeve will assume the responsibility of advising Police, The Chief Administrative Officer, the Head of Council, and the EMO Co-ordinator.

Conversely, if the City Administration learns of an emergency in advance of News Media, the City Clerk, who is the Public Information Officer, will advise media and will ensure an on-going flow of updated information.

B. In the event of a *general* emergency, the Station Manager or his alternate will institute the following emergency proceedings:

1. The Station Manager will call in the Program Manager, Sales Manager, News Director, a representative from Engineering, and the Switchboard Operator.
2. The main switchboard and the Open Line board will be operated on a 24-hour basis. The regular switchboard operator will call together the Traffic staff and schedule their coverage, and the regular Open Line operator will call together the Ad Service staff and schedule their involvement.
3. *The Program Manager will:*
   (a) Put the Station on daytime pattern.
   (b) Arrange to simulcast to FM and advise listeners accordingly.

(c) Arrange for announcers and operators (both full and part-time) to be available for their regular shifts, but to operate a Night Line type format for as long as a telephone service is meaningful.

(d) To liaise with News Director to free up time required to carry any news services which are considered to be vital by News Director.

(e) Arrange to drop all commercial content and all other regular features. We will operate an "Open Line" and "News Service" only.

4. *The Sales Manager will:*

(a) Ensure his female staff assume delegated switchboard duties.

(b) Use the Sales staff, as directed by News Director, to assist in any area required.

5. *The News Director will:*

(a) Dispatch a reporter to all vital areas of activity. (e.g. Police, fire, etc.)

(b) Use telerecord number for reporters, stringers, etc. so as not to tie-up other switchboards.

(c) Discontinue regular newscasts, but detail an editor-announcer to join Open Line announcer every thirty minutes (on hour and half-hour) to update firm information re emer-

gency. News person to remain with announcer for as long as it takes to effectively update listeners.

6. *The News Editor will:*
   (a) With the help of three secretaries, constantly monitor on-air presentation and establish a cross-reference system to catalogue information received and action requested.
   (b) File updated hourly reports with both switchboards to ensure they have accurate information to handle most routine calls without their having to go on air.

EMERGENCY — TYPE 5

A National emergency, because of our CBC Affiliation, is handled by them, and no action is to be taken other than to technically turn the facility over to them.

Staff will stand by for instructions which can only be formulated by the Government through the CBC.

EMERGENCY ALERT CHECK LIST
(while caller is on line)

1. TIME OF CALL .....
2. CALLER'S MESSAGE (Write down the message as accurately as possible) .....
   .....
   .....
   .....
3. What type of threat? (bomb? physical violence? other?) .....
4. Where is it to happen? .....
5. When is it to happen? .....
6. Why is it to happen? .....
7. Was there any particular staff member's name mentioned or a particular story or other cause?
   .....
8. If you can recall any of the following, it would be helpful:
   (a) Voice (male or female) .....
   (b) Sound (high-pitched, low, normal, child, adult) ..
   .....
   (c) Composure (excited, irrational, normal) .....
   .....
   (d) Telephone call (local, internal, WATS, long distance) .....
   (e) Any background noise .....
   (f) Did the caller stutter, foreign accent .....
   (g) Was there anything else unusual about the call or caller .....
   .....
9. Who did you notify? (supervisor, manager) ..
   .....
10. At what time? .....

PLEASE COMPLETE THIS REPORT, SIGN IT, AND GIVE IT TO YOUR SUPERVISOR AT ONCE.

Received by .....
Date .....

— NOTES —

— NOTES —

— NOTES —

CFPL 980 EMERGENCY OPERATION PLAN BOOKLET

by

C. N. Knight
Manager, CFPL Radio

The creation of an emergency operation plan booklet stems from CFPL Radio's basic philosophy which simply stated is, "to be involved in anything that may be of interest to, or affect the lives of, all citizens within our radio commubity". This basic programming philosophy, which goes back to 1961, lead us into the daily use of what we have always called "CFPL'S Open Line Show", and other audience participation type shows as required to cover elections or other very special occasions happening within our community. Because of our open line concept and the fact that for years people felt free to talk our moderator, to other people about any topics that might come to their mind it naturally followed that in the case of emergencies these same people would look to us for advice and for a medium through which emergency information could be funneled and action started.

Because of this basic philosophy and because of the nature of our people, we were able, during three successive emergencies in our community to convert our operation to an open line technique to serve a meaningful and vital purpose. The first occasion was during an ice-storm in February, 1969, the second, a major electricity blackout in all of the eastern States and eastern Canada in 1970, and the most recent the blizzard in January, 1971. The analysis of CPL's part in disaster response indicates what radio can do in an emergency. We were proud of our role in all of these major emergencies and in many many lesser types of emergent situations. However, we realized that if we were going to perform with true professional skill it was vital that a plan be developed which would clearly define our responsibilities. Equally important, such a plan would indicate the manner in which we could fit ourselves into the fabric of the entire community.

The booklet "CFPL 980 Emergency Operation Plan" is the result. It is a good plan and while it is unsophisticated, it will now form the base from which we may develop a firm structure to cover any situation that might arise in the future. ▲

you will, rather than the medium, as callers comment on Sesame Street, newspaper editorials, bestsellers, all told making up seven per cent of calls. But during the blizzard the focus shifted sharply from content of communications channels to the need for establishing and maintaining channels of communication as messages concerning telephone, newspaper and radio usage itself were transmitted via radio. If telephone lines had been damaged, radio usage and concern about communication would have undoubtedly been higher.

Governments and their Services

During the regular Open Line show calls dealing with governments refer to policies behind government functioning, thus the orientation is both temporally and spatially remote, with 19 per cent of calls dealing with what governments ought to do, but during the blizzard the comments became concerned with the immediate and local; with such things as details of Hydro's power operation and the operation of the L.C.B.O. Approximately seven per cent of messages dealt with government services.

Business Firms

Before the storm there were no calls dealing with business firms, but during the emergency, such calls amounted to seven per cent of the total transmissions. These most often involved employers informing employees whether they should report to work or announced to worried families that employees were being housed at work overnight. Some announced that they were closed.

Recreation

During normal times, nearly 19 per cent of Open Line calls dealt with such recreation topics as zoos, fairs, crafts and sports activities but during the emergency this topic dropped to seven per cent, mostly to announce cancellation of events.

Consumer Goods and Services

Before the storm, six per cent of all calls dealt with consumer goods and services. Callers request information on "fuddle duddle" shirts or Swedish health shorts; protest certain store policies or register a complaint about a product—but during the blizzard such calls dropped substantially, to two per cent, and these were concerned with the sheer availability of services, the opening and closing time of establishments, etc.

Social Problems

Usually, this topic is a major category, making up 18 per cent of all calls (hippies, discrimination, free speech, etc.) but during the blizzard the only problem discussed was the emergency condition itself.

Miscellaneous

A great number of diffuse calls, 11 per cent, are made during normal times, involving sheer chatting, describing UFOs, offering to give away puppies, etc., but during the emergency this figure dropped to two per cent. And those that were classified as miscellaneous often were focused on the storm, such as suggestions on games to amuse children cooped up in the house.

We have examined the way in which the pattern of concerns as reflected on radio changed during the storm. However radio, as will be seen, did more than passively reflect these changed concerns; it became an important mechanism in community coping.

RADIO'S DYNAMIC FUNCTION: THE VITAL LINKAGES

Earlier it was suggested that radio became, in a sense, an actor in the system of transactions during the emergency. Rather than functioning in a reflective way only, radio became dynamically involved. One can envision two kinds of models for the mass media in such situations: at one extreme they rather passively serve as media and as a reflector of events. In the other, they not only become an integral part of a community-wide closed hierarchically-ordered communication system but actually serve to generate imperatives. A complete "servo" model of emergency organizational control outlined by Williams (1956) emphasizes the importance of feedback in the process of linking supplies with areas of need.[1] Messages are fed into a "comparer" which analyzes what needs remain to be filled or whether there has been a surfeit of a certain resource supplied. This control centre then sends out error messages which order any necessary readjustment of distribution. The emergency radio operation of CFPL resembled, in many ways, the servo model inasmuch as it attempted to link "resources" which in this case includes information as well as goods and "reassurance" with those who were in need of it. In this chapter we are going to examine the way in which radio brought together resource people (individuals in possession of essential information) with individuals or centres requiring information and provided authoritative data in the form of recommended behaviour; aided supply centers in the reallocation of goods, and served as a source of emotional support.

Linking Information Sources with Recipients

Radio normally serves the community as a source of important and trivial information. People call the Open Line Show to get a factual response to legal questions such as licence plate deadlines; general information

1. A. H. Barton, Communities in Disaster, (New York: Doubleday, 1969)

About 12,000 students in Middlesex, Oxford, Perth, and Huron counties were trapped in schools when buses got bogged down on snow-swept streets.

Many motorists waited several days for street clearing operations to free their vehicles from snow-plugged streets.

about recipes or travel and specific details about upcoming community events such as fairs or craft shows. These inquiries are often responded to by other listeners who call to supply the required information. In this way radio serves as a link between information need and information source. Nearly half of all the calls made to Open Line under normal conditions either request or give information. 24.3 per cent of callers gave information in our sample and 23.8 per cent of callers requested information.

During the emergency, because the normal functioning of the city was disrupted, the information linkage which was provided by radio took on increased importance. The immediate reaction of the community to the change in its environment was an attempt at re-orientation. To facilitate this adaptation it was necessary that the public know the exact nature and extent of this change. They needed to know where they could get aid, what transportation was available to them and when conditions would return to normal. Nearly 40 per cent of all incoming messages dealt with this kind of information.

Many individuals and institutions who normally function behind the scenes to maintain the operation of the community realized that their knowledge was required and came to the fore. This supplying of factual information to the public was the primary use that community organizations made of radio. Under normal conditions organizational representatives make up 7 per cent of the Open Line callers. Throughout the blizzard this figure rose to 27 per cent. Radio's services were essential to these organizations because, although many of them have efficient interorganizational channels (such as the Public Utilities Commission, Police Department, and Fire Station which are all linked by 'hot lines') radio is the sole method available for rapid public contact.

Because messages provided by these organizations were objective and official, people in need of information turned to radio. It is impossible to estimate the number of people who were supplied with the information they needed merely by listening to the radio without having to make personal contact. Nevertheless over 21 per cent of the incoming messages during the blizzard were requests for further information. Many more questions from the community were never aired directly but were immediately answered 'behind the scene' by the radio stations' switchboard operators.

Very few municipal organizations contacted radio with requests for information. Because they were intent on the task at hand and well supplied with first-hand emergency reports, organizations such as the Police, Fire Station, P.U.C. and City Works did not rely on radio as a source of information.

Other organizations, although they did not contact the radio station directly with requests for information, were able to make use of the information that was transmitted over the air. The London Transportation Commission relied on their own mobile inspectors for road condition reports but did feel that the radio served them as a secondary source of information. The Mayor felt that he as well had looked to all the radio stations for up-to-date information.

TABLE 2

Purpose of Radio Usage and Comparison

Purpose	*Emergency Operation*	*Open Line*
1. REALLOCATION OF INFORMATION	%	%
Supplier:		
Information Given	39.3	24.3
Advice Given (Behaviour Recommended)	9.9	2.8
Receiver:		
Information Requested	21.4	23.8
2. REALLOCATION OF GOODS		
Supplier:		
Resources Offered	7.2	2.0
Receiver:		
Resources Requested	6.4	3.3
3 EMOTIONAL SUPPORT		
Praise, Thanks given	3.8	1.8
Assurance Given	3.6	—
Personal Transactions	6.8	.8
4. OTHER		
Opinion Given	1.3	36.0
Personal Complaint	.5	N.A.*
Chat, Joke	—	5.3
Total	100.0	100.0

*Because of the difficulty of differentiating between a personal complaint and an opinion as expressed on the 'Open Line' show all calls of this nature were included under Opinion Given.

Recommending Behaviour

Under normal conditions very few callers take it upon themselves to recommend a course of action to the listening audience. There are a great many opinions expressed (36 per cent of all calls) but they are usually of an abstract nature and do not lend themselves to immediate action. Fewer than 3 per cent of the Open Line callers phoned to advise specific behaviour to the public. During the emergency it became essential that public behaviour be channelled in order to facilitate overall community cooperation. Calls of recommendation and offers of advice rose to 10 per cent of the input.

People explained various policies to the community via radio for the purpose of community cooperation. As a result of complaints about people using snowmobiles, not for emergencies but purely for amusement, police reported that all usage must have official authorization. The names of the streets being plowed were broadcast and it was pointed out that the police and city works department "would appreciate the owners removing their cars as soon as possible." Bell Canada phoned with certain recommendations concerning the use of telephones to prevent high usage from causing overloading.

Reallocation of Resources

Under normal conditions radio serves to link people with resources to offer to those who are in need. Callers phone to find a good home for their dog and others call to explain that there is a family of ten in their neighbour-

hood having no washing machine. Three per cent of the total Open Line callers request resources and a further 2 per cent offer resources.

During the emergency the reallocation of resources became a primary concern and calls of this nature more than doubled in frequency. Over 13 per cent of the total callers either requested or offered resources. Suppliers and recipients were represented nearly equally in the calls. Over 6 per cent of the callers requested resources and over 7 per cent offered resources. These resources included everything from free billeting, blankets and food, to insulin for a man unable to get medical attention. Some people phoned to offer their own manpower. They volunteered to shovel driveways, move stuck cars or simply work where they were needed.

As is frequently the case in small scale disasters (Burton, 1969) there was a surplus rather than a deficit of resources offered by the public. The radio announcer found it necessary to request that no further calls be made for the purpose of offering billeting. He stated that if billeting was needed a specific request would be aired. The same problem arose when the supply of manpower exceeded the need. A list of volunteers was kept at the radio's switchboard and by the end of the emergency, transactions of this nature were carried on behind the scenes without being aired directly.

It was representatives of health, safety and welfare organizations who made the greatest use of radio in order to request resources. (Over 28 per cent of their calls). Many of these people were phoning on behalf of spontaneous disaster organizations, such as the ones set up in Lucan and Orchard Park. They requested supplies such as snowmobiles and manpower in order to handle local problems.

Educational representatives also made over 7 per cent of their calls for the purpose of requesting resources. Their concern was for food, blankets and volunteers to stay with the school children.

Although the city's municipal services have special emergency procedures which make certain resources immediately available to them, such as heavy duty equipment, one municipal service did find it necessary to turn to the public with a request for resources via radio. The Central Fire Station requested that private citizens with emergency vehicles lend them to the city for the duration of the storm. The first call to the radio station was sufficient to beseige the fire station with offers of help. Most of these messages of request and demand were randomly directed at a general audience. There was, therefore, no way of ensuring that, for example, Medway High School did get the blankets that it required, or whether supply exceeded demand (i.e. there was no mechanism for maintaining perfect control over resource allocation). It has been found in previously studied disasters that a centre set up to co-ordinate those messages offering a resource with those reporting a need, was best equipped to rationally distribute supplies. (Barton, 1969).

The radio made unprecedented use of its transmission potentials during the blizzard by setting itself up at one point as a controlled distribution and supply centre. Radio provided the communication that facilitated the link-up between Medway High School, in need of blankets, and residents of Orchard Park who were able to supply the needed resources. The transportation between need and supply was provided by a taxi cab driver who maintained constant communication with the radio station. As a new source of supply arose (i.e. a caller phoned the radio station with a further offer) the station relayed the information to the driver en route. Here the driver served a role as a controlling mechanism ensuring that supply did not exceed demand.

In most cases rather than serving as the coordinating unit itself radio encouraged the establishment of supply centres. At one point during the emergency operation a restaurant phoned to request resources. The announcer recommended that rather than responding through the Open Line all those with supplies to offer should place their calls directly to the restaurant. In this way action between supplier and recipient could be coordinated more efficiently.

Radio was also able to assist supply centres that spontaneously developed over the duration of the blizzard in both London and the surrounding townships.

Many of these co-ordination points used radio as an extension of their own communications network. They phoned the Open Line both to request additional resources and to acquaint the public with their existence and their ability to furnish aid. Lucan set up a command headquarters at their local Legion Hall and channelled radio messages through this centre. A man from Orchard Park established a supply co-ordination depot for that area. He called the radio station to request further donations of 4-wheel drive vehicles, snowmobiles and any skilled individuals who might be willing to offer their services. The Moose Lodge also set up a disaster headquarters and relayed a message to all the members over the radio requesting their assistance and used the radio to inform the public of their existence.

Emotional Support

As can be seen, radio performed a very practical function by providing the community with those resources, such as objective information and essential supplies which are necessary for adaptation to a blizzard-wrapped city. There is another need which becomes very apparent in any time of stress, the need for emotional support.

There is a complex interaction between these two functions. By easing community tension radio kept hysterical reaction to a minimum and this calm atmosphere of reassurance facilitated the practical reallocation of goods. In turn, because needs were being filled almost as soon as they were known, there was little call for alarm.

Radio was able to serve as a source of security merely by being there. The principal of Katharine Harley School explained that hearing the radio broadcast gave those who were snowbound a feeling that they were in

Snow-clogged Highway 401 east of London was littered with abandoned vehicles. Hundreds of motorists took refuge in service centres. In London traffic crawled on streets as workmen fought a losing battle.

contact with the outside world. It lessened their feeling of isolation and provided them with the realization that a source of objective information and an over-all mechanism for coping was available for their use.

There were also deliberate attempts made by both radio personnel and the community to provide reassurance by relaying messagse explicitly to ease the apprehensions of the listening audience. This phenomenon was unique to the blizzard operation. On no occasion during the normal Open Line program sampled were such messages relayed. During the blizzard however, the radio announcer devoted nearly 5 per cent of his transaction time to messages of assurance. He told parents of school children not to worry because "we'll get word to you as quickly as possible". "We're passing all information along to you". "Don't worry, parents, the kids are excited, this is a new experience for them."

Helicopters were pressed into service to evacuate the sick and injured.

Photographs courtesy of The London Free Press

During the blizêard, individuals also phoned in to give reassurance to the general audience. Over 3 per cent of the calls were made to tell people not to worry. For example, one woman called to say that her husband had just telephoned her from Stratford to report that the sun was shining there. She told people with relatives and friends in that area that there was no need to be concerned about them.

Organizations also focused attention on reassuring the public. Of these, it was the educational institutions which devoted the greatest percentage of their calls to providing reassurance, most specifically to the parents of billeted and snowbound children. Over 15 per cent of their calls were made for this purpose. One principal explained that it eased the minds of the parents to be able to hear her voice directly over the air and note from her tone that everything was truly under control. In addition, this use of radio provided her with a personal reassurance because she was doing everything possible to maintain contact with the families of her children.

Representatives of business firms alos used radio to transmit messages of assurance. Over 6 per cent of their calls were made to assure families of people snowbound at their place of employment, that they were being well taken care of.

Representatives of communication fields such as Bell Telephone and the London Free Press made 5 per cent of their calls specifically to ease anxieties. Their messages reassured the public that all efforts were being made to continue normal operations.

Representatives of municipal services made over 2 per cent of their calls to assure the public that the community was in no danger and that any problems that arose such as power failure were being handled as quickly as possible.

As well as easing the anxieties of the general public, reassurance was also relayed within several organizations through the use of radio. Employers explained to their employees that there was no need to attempt to come to work unless it was perfectly safe to do so. Both Bell Canada and Victoria Hospital felt that radio assured their employees that everything was under control and therefore there was no need for them to attempt to travel.

During the Open Line program the announcer and callers praised the community for specific actions, such as charity drives, or for more general attitudes, such as hospitality to newcomers. Such messages tend to decrease individual alienation by generating the feeling of community, i.e. "that we are all pulling together". 1.8 per cent of the Open Line calls fell into this category.

Because the need for a feeling of community was greater and because the people were in fact, working as a team, praise and thanks were given with greater frequency during the emergency operation. 2 per cent of the announcer's messages were made for this purpose. He repeatedly thanked the audience for their co-operation and said how pleased he was with the response that the radio personnel had received from the community in such a time of need.

3.8 per cent of the incoming calls were also made for the purpose of giving praise or thanks. Such messages were directed at the audience in general or to a specific group or individual. One woman phoned to relay her thanks to those people who had helped her move her car.

Many of the organizations who had received support from the community expressed their gratitude via radio. Representatives of educational institutions made over 5 per cent of their calls in order to praise the public. Their thanks were given for the food and blankets that were quickly supplied by surrounding neighbours upon notification of a need. Thanks was also given to people who volunteered to supervise the children during their stay at school.

Representatives of business firms made over 2 per cent of their calls to thank those people who had provided the firms with needed supplies.

Radio, as well as transmitting actual supportive messages, provided another means for the easing of anxieties by establishing a channel of transmission for intercommunity contact. Some callers did not call radio to request resources or information but in order to transmit a personal message to a family member or friend. This proved to be a great source of emotional support; people felt that they were doing everything possible to establish communication with those people that they were concerned about. Under normal conditions other means of personal communication are readily available and very few personal messages are relayed over the 'Open Line'.

Emergency radio aided in providing orientation to its listeners, orientation in a cognitive and an emotional sense, but while it was doing this the customary pattern of channels linking radio to its listener changed, as will be seen in the next chapter.

RADIO'S DYNAMIC FUNCTION: CHANNELS THAT CHANGE

In the last chapter we described the way in which radio established linkages between individuals in need and resources that were available. This is possible during regular open line broadcasts by simply announcing a need or the availability of a resource so that listeners in the former or latter situation can take advantage of the knowledge. Radio, in such a situation, is still operating essentially as a mass medium. However, radio call-in shows have the potential to operate in a more selective manner by serving as a message conduit so to speak to highly specific groups, by passing on messages intended for specific individuals. Thus, radio can operate more like traditional two-way channels such as telephone in targeting messages from single sources to single recipi-

ents even though the entire apparatus of the mass medium is brought to bear. For example, during the storm there were a great number of people for whom contact had been broken with families and friends who were on the road, in distant cities, possibly marooned in gas stations, hotels, etc.

Table 3 illustrates the change in radio's operation during the emergency. Both Open Line and Emergency formats make possible a number of different channel configurations:

One way diffuse, in which a message is aired to the general public.

One way specific, in which a message is intended for a specific individual or a specified special grouping of individuals (e.g., individuals in one area of the community, occupational groups such as doctors, etc.).

Two way, in which feedback is provided via radio; individuals respond to a previous caller (delayed two way), or interact on air directly with the host.

TABLE 3
Method of Transmission and Comparison

INPUT: *Transmission Type*	*Intended Receiver*	*Emergency Operation*	*Open Line*
		%	%
Diffuse One-Way	General Public	65.1	55.5
Specific One-Way	Specific Individual	7.6	.8
	Special Grouping	2.1	1.0
Two-Way	Response to Previous Call	1.8	39.0
	Question Directed at Host	23.3	3.8
Total		100.0	100.0

During the emergency the ratios of channel usage shifted. There was an increase in one way diffuse messages directed to the general public as announcements concerning weather, transportation and other blizzard urgencies were aired. There was a substantial increase in the proportion of one way specific messages during the storm, while the proportion of calls of a two way nature diminished. Two way communication in which responses were to previous calls dropped considerably while two way communications in which questions were directed to the host increased. We shall examine each of these categories of channel configuration in turn below.

One Way Communications

Normally, the open line show airs a small percentage of one way transmissions aimed specifically at individuals or groups, (The telephone is usually considered the most efficient means for targeted transmission between individual and individual.) In normal times, fewer than one per cent of calls were of this nature, according to Table 3. Then, during the emergency, the proportion went up nearly eightfold. Many of the cases involved individuals who were driving in cars, thus unreachable at a specific location and the car radio was the only medium by which the individual could be reached. One woman, for example, asked on radio that her two children who had started out from St. Mary's that morning and had not been heard from since, contact her.

Radio also is a method by which through the airing of but one message, an individual can contact several members of a group at a time or make contact with a specific section of the community. During normal times, one per cent of the Open Line calls were of this type. However, the figure doubled during the emergency program. Some of the messages were directed at certain geographical districts (e.g. warnings to residents of specified rural areas) or at parents of children in specified schools. For example, parents of Medway students were informed that the bus lines were not running and the children would be billeted at the school overnight. Some schools phoned to inform families of staff members that the teachers would be remaining overnight to supervise children.

As the principal of Katharine Harley School pointed out there could have been no alternative procedure to radio use in their case. It would have been almost impossible to contact the parents of her children without the radio because many of their families live in outlying districts and have no phone. Because of the poor visibility on January 26th the bus lines advised their drivers not to attempt to bus the children of one school to their homes. As a result 52 children, 11 staff, a couple of volunteers and 6 bus drivers were forced to remain at the school until the children could be removed by the army's half-track vehicles two days later.

The medical director of one hospital made use of radio to contact persons scheduled for admission that day who were told not to try to come to the hospital. They were warned that it was not safe to travel and even if they did arrive they could not be assured of a bed. Such hospital messages probably prevented some difficulties that would have arisen if more people had decided to travel.

Many municipal service organizations have their own internal communication systems which allowed them to maintain contact with their employees. Other institutions found the radio a valuable channel for relaying instructions to their staff. The London Transportation Commission used the radio to notify its operators when to report to work. Bell Canada relayed both information and assurance to its employees via radio. Its staff was told to remain where they were and that only if they were needed would they be contacted. The Director of Nursing at Victoria Hospital told its nurses, over the radio, that they were only to travel if it was safe to do so.

Business firm representatives also made use of the radio. Through radio transmission it was possible for firms to inform their employees of shut-downs, changes in shift or resumption of the normal operations of their establishment.

Two Way Communication

Critics of mass society in the past have pointed to the lack of true two-way communication as one of the

alienating facts about existence in large scale post industrial societies. The invention of the call-in radio show, some would assert, is a means of re-establishing person-to-person communication with the aid of mass media. Callers respond to the remarks of the host or to those of a previous caller. Often a comment made by one caller will spark a controversy that will be the focal point of many of the subsequent calls. Nearly 39 per cent of the total Open Line calls were made specifically in response to a former call. During the emergency, however, although there were still some listeners who called in to respond to a former caller, they now made up less than two per cent of the total calls. Typical was the case of the woman who had phoned to find out if roads were hazardous all the way to Toronto since her husband was on the road and she was concerned for his safety. A truck driver who had just driven the route phoned to assure her that it was clear on the other side of Woodstock. Thus, typically, rather than dealing with matters of opinion, such calls now dealt with information.

The Role of the Radio Host

No discussion of the way in which channel configurations shifted would be complete without an examination of the central linking figure in the communication system, the radio host. The role of the radio host during the regular Open Line programme is mainly one of a transmitter who receives comments and questions from a caller and transfers the message to a listening audience. Although many of the callers demand factual information, such as the time of a local fair, the announcer is not expected to be in possession of this knowledge and the answer usually comes from a subsequent phone call from a listener. As such the purely factual questions are aimed at a general audience. There are occasions when the announcer is asked to preform the role of counsellor when he is given a problem and asked to suggest a solution, but under four per cent of the Open Line callers asked for this service, as is indicated Table 9.

However 23 per cent of the calls during the emergency operation were directed at the radio announcer. It was the two-way transmission established between the caller and the radio announcer that took precedence over communication between callers. These callers were either requesting specific information or seeking advice. The announcer was most often consulted when it was a question of whether or not the caller should attempt to travel to his home or office. But the announcer was asked to recommend behaviour in a variety of cases. One man phoned from a highway crew and explained that the crew's foreman had not yet arrived at the site and the crew was at a loss as to what to do. The announcer's advice was sought as to the best course of action.

The centrality of the radio announcer is understand able when it is remembered that he was in possession of most of the known information and therefore in a good position to direct or recommend action. This vantage point was recognized by the public who sought the announcer's counsel and by the announcer himself who did not hesitate to recommend a course of action. During the emergency operation he devoted over 22 per cent of this transmission time to the recommending of certain behaviour.

During the Open Line show the announcer spends nearly a quarter of his transmission time voicing opinions that do not advocate any specific course of action for the listener. This happened only 3 per cent of the time during the emergency. An example of such opinion giving occurred when a caller phoned during the blizzard to complain that her paper was late. The announcer expressed the feeling that "it was hard to believe" that people would be so petty at a time like this.

This, however, was the exception. During the emergency operation nearly all the radio announcer's transmissions were action-oriented. He advised people: "Don't travel." "If you're at home stay there." "Assume that all meetings are cancelled." "Don't go to work." "Try and remove your car, it's probably blocking snow removal."

The radio announcer also made increased use of the two-way channel established between himself and the audience. Requests for information, directed to the public at large, or to a specific source made up over 6 per cent of his transmissions. He made use of the channel in this way under 1 per cent of the time during the Open Line programme. During the blizzard, in order to remain in possession of all necessary information, it was often necessary for the announcer to request additional facts. This need was particularly evidnnt when the announcer was uncertain as to what the official ruling was regarding the use of snowmobiles. He thus requested over the air that the mayor telephone him with this information so that he could best advise the snowmobile owners who were calling to seek his advice. The mayor complied.

EPILOGUE

We have in the present study attempted to describe the way in which a mass medium, radio, transformed its normal open line operation in order to provide direction and orientation to an entire community in its efforts to cope with a natural disaster. We have examined the kinds of concerns that were mirrored in radio's operations, the view of the community which we were provided through a near all-encompassing channeling of messages through one medium. We have made allusions to a servo-communications model for use in community emergencies. While the picture presented is only that of one radio station's attempt to cope with a multiplicity of activities that in sum constitute the major concerns and activities of an entire community and its successes,

there is a lesson here for future planning of communications systems for emergency operations. These are apparent by considering just a small number of the problems that did arise during radio's emergency operations because of the lack of a pre-established integrated emergency communications plan.

Both the City Hall and Department of Highways had difficulty getting through to the radio station by dialing the public "open line" number. The Mayor felt that ideally there should be a "hot line" linking the radio stations and the municipal government in spite of the fact that "these emergencies happen only once in a while". Another problem occurred because the network was forced to operate on the basis of such an open model. There was no authority check through a clearing agency to assure that all messages were genuine or authorized. A complication over the use of snowmobiles, for example, resulted from opinions being given about their usage without any formal authorization. The Central Fire Station was also faced with a problem when it was implied via radio that the fire stations would provide transportation for nurses. They were bombarded with requests for this service when in effect transportation was to be available to medical staff only in the case of an emergency.

A control centre also has the advantages of being able to supervise the original allocation of resources. It was impossible for radio to do this in most cases because its communications channels are not prestructured for such emergency service.

The present study by describing the pattern of communications channeled through radio on the air suggests the focal problems that arise during such an emergency and the way in which such a communications medium can serve to assuage the effects of a community emergency. Hopefully, it will serve to provide guidance to media operators and personnel and community leaders in order to make provisions in advance for the best usage of such media, and to other researchers as a guideline for further work in this neglected area.

APPENDICES

Sex as a Factor in Emergency Radio Usage

There is a change in the sex ratio of radio callers before and during the storm. During the 'Open Line' program it is the females who place the majority of the calls (58.2 per cent) but this dropped to 41.5 percent during the emergency operation. Male representation rose from 41.8 per cent to 58.5 per cent. This shift in pattern is partially explained by the fact that community organizations made extensive use of radio during the emergency and it was more likely to be a man who phoned on their behalf. Nearly 40 per cent of the males called the radio station in either their professional role or as representatives of an organization. Under 10 per cent of the females assumed these same roles.

Males and females did not play roles of supplier and recipient with equal frequency. A picture emerges of the role division that occurred during the emergency operation of radio. Males relayed over 72 per cent of all the information that was given. This is understandable because many of these men represented organizations and organizations devoted much of their transmission time to the providing of information. Females devoted twice as great a proportion of their calls to seeking information as did males. Under 16 per cent of the messages from males were requests for information although such requests made up over 30 per cent of the female calls. This role division is not as marked during the regular broadcast. On Open Line, males still devote more of their messages to the giving of information (nearly 30 per cent compared to 20 per cent of the females' messages) but information requests are made almost equally by males and females. Requests make up 23 per cent of the male calls and 24 per cent of the female calls.

Although males and females each made over 7 per cent of their calls in order to offer resources, females showed a greater tendency to request resources. Over 8 per cent of the female calls were made to express a need for something as compared to 5 per cent of the male calls. On the Open Line program the female users show a far greater concern with the exchange of resources than do the males. 3.1 per cent of female calls are offers of resources compared to .6 per cent of the male calls and 4.4 per cent are requests for resources compared to 1.8 per cent of the male calls. It appears that

TABLE 4
PURPOSE OF RADIO USAGE AND COMPARISON BY SEX

Purpose	*Emergency Operation*		*Open Lnie*	
	Male	*Female*	*Male*	*Female*
1. REALLOCATION OF INFORMATION	%	%	%	%
Supplier:				
Information Given	45.5	29.1	29.7	20.4
Advice Given (Behavior Recommended)	12.8	4.9	1.8	3.5
Receiver:				
Information Requested	15.9	30.7	23.0	24.4
2. REALLOCATION OF GOODS				
Supplier:				
Resources Offered	7.2	7.4	.6	3.1
Receiver:				
Resources Requested	5.1	8.7	1.8	4.4
3. EMOTIONAL SUPPORT				
Praise, thanks given	4.2	3.1	1.2	2.2
Assurance Given	3.9	2.8	—	—
Personal Transactions	4.0	11.3	1.2	.4
4. OTHER				
Opinion Given	1.3	1.2	35.2	36.5
Personal Complaint	.2	.9	N.A.*	N.A.*
Chat, joke	—	—	4.9	5.2
TOTAL	100.0	100.0	100.0	100.0

*See Table 1

the practical role of resource allocation that the woman assumes on the radio under normal conditions is taken over by males in times of emergency.

During the emergency women much more than men used radio's services in order to conduct personal transactions. Over 11 per cent of the female calls as compared to 4 per cent of the male calls were made in an effort to establish communication with family or friends.

TABLE 5

Method of Transmission and Comparison by Sex

TO WHOM: INPUT					
		Emergency Operation		*Open Line*	
Transmission	*Intended Receiver*	*Male*	*Female*	*Male*	*Female*
		%	%	%	%
Diffuse One-Way	General Public..	74.6	51.8	55.8	55.2
Specific One-Way	Specific Individual...	3.6	13.1	1.2	.4
	Special Grouping	2.1	2.2	.6	1.3
Two-Way	Response to Previous Call.	.8	3.3	38.8	39.1
	Question Directed at Host.	18.9	29.6	3.6	3.9
Total		100.0	100.0	100.0	100.0

In an overview of the methods of transmission, was preferred usage determined at all by sex? The male callers did show a definite tendency to make diffuse one way transmissions. Females preferred two way or specific one way transmissions. Nearly 75 per cent of all messages made by males were directed at a general audience and under 6 per cent directed at a specific group or individual. On the other hand, women directed under 52 per cent to a general audience and over 15 per cent of their calls to a specific group or individual. Females also directed nearly 30 per cent of their messages to the radio announcer compared to 18.9 per cent of the males. This pattern was not revealed under normal conditions when both sexes used all channels with equal frequency.

This pattern during the emergency is again partially explained by the fact that it is more likely to be a man who phoned on behalf of an organization and he is concerned with transmitting his message to the largest possible audience. The majority of the females were more concerned with establishing two way and one way specific contacts because of their more personal concerns with family and friends and possibly because of the reassurance they gained from these methods of communication.

TABLE 6

2. RADIO'S USERS

(All Sources - Input & Output)

	Emergency Operation
Radio Personnel	36.8
Individuals	42.8
Representatives of Organizations	20.4
Total	100.0

TABLE 7

ORGANIZATIONAL USAGE & COMPARISONS

(Input Only)

Organization	*Emergency Operation*	*Open Line*
	%	%
Representatives of Health & Welfare Organizations	3.7	.3
Recreational Representatives	1.7	3.8
Representatives of Municipal Services	3.5	—
Representatives of Transportation Facilities	3 9	.5
Representatives of Educational Institutions	7.6	1.3
Business Firm Representatives	5.5	.3
Representatives of Communication Fields	1.1	—
Individuals	73.2	93.9
Total	100.0	100.0

TABLE 8

RADIO USAGE

Individual by Sex Comparison

	Emergency Operation	*Open Line*
	%	%
Male	58.5	41.8
Female	41.5	58.2

TABLE 9

RADIO HOST'S ROLE AND COMPARISON AS PART OF TWO-WAY TRANSMISSION

Purpose	*Emergency Operation*	*Open Line*
1. REALLOCATION OF INFORMATION	%	%
Supplier:		
Information Given	53.1	7.4
Advice Given (Be .aviour Recommended).	22.2	6.4
Receiver:		
Information Requested	6.5	.8
2. REALLOCATION OF GOODS		
Supplier:		
Resources Offered	3.5	.3
Receiver:		
Resources Requested	2.9	.3
3. EMOTIONAL SUPPORT		
Praise, thanks given	2.3	2.6
Assurance given	4.9	—
Personal transactions	1.5	—
4. OTHER		
Opinion Given	3.2	24.0
Neutral Response	—	25.6
Passes Question/Answer on to Audience	—	32.7
Total	100.0	100.0

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UNITED KINGDOM HOME DEFENCE

An address by the Parliamentary Under Secretary of State, Home Office, Mr. David Lane, M.P. at the Twentieth Annual Conference and Study of the Association of Civil Defence Officers June 28, 1972.

I want to talk generally about Home Defence in the United Kingdom. I stress this is the first opportunity which a Home Office minister has had of publicly addressing a wider audience, in order to back up the decisions and the guidance set out in the circular issued last March. I know some of you have felt that not enough publicity was given at the time to the important changes covered by the circular. I trust that what I have to say will help to remedy any earlier lack of coverage. The pity is, as we are all aware, the subject of Home Defence does not command a great deal of parliamentary time it is rarely dscussed on T.V. or radio or in the press and, perhaps understandably, claims little public interest. Nevertheless, I regard it as an extremely important area of government activity. I was paticularly pleased therefore when the Home Secretary invited me, in April of this year, to take over special responsibility in the Home Office for this Home Defence and Civil Defence work.

My first task on taking ministerial office was, of course, to look carefully at what was already being done and what is now planned in the field of home defence, not only in local government, with which your Association is perhaps more familiar, but also in the various central government departments. I paid particular attention to the relevance of what is being planned in the knowledge of the current assessments of the various types of threats to the security of this country. I read with great interest the report of the local authority associations' study "SURVIVAL I" which highlighted many of the defects of our home defence arrangements as they were in 1970, resulting from the care and maintenance decisions of 1968. I was greatly helped by the work done in 1971 by officials and by my predecessor, Richard Sharples, in the comprehensive Home Defence Review which the Government commissioned shortly after taking office. I hope you will see that it is perhaps a measure of the importance which the Government attach to home defence precautions that, despite their many other pressing preoccupations in June 1970, the Conservative government honoured their promise to strengthen the Territorial Army and, in addition, decided to mount a searching review of all home defence measures.

No one could dispute the first conclusion reached at the local authority associations' study "SURVIVAL I", to the effect that "the care and maintenance basis of civil defence was totally unsatisfactory." However, I do not propose to go over the possible errors of the past. I know that most of you will wish, as I do, to look to the future. However, it seems clear that the abrupt and arbitrary nature of the 1968 decisions, taken apparently on the grounds of financial expediency, without any attempt to explain or rationalise their consequences, immediately induced a feeling of apathy both among local authorities and more widely with the general public. This induced apathy has been seriously damaging to this important field of work. I have no doubt that the arrangements which stemmed from the 1968 decisions failed to produce a viable home defence programme and, perhaps not surprisingly, the country was not getting the best return for even the reduced amount of money which was being spent. If we accept that the reasons behind the 1968 cuts were predominantly financial, then it is doubly important for us to re-allocate this expenditure so as to get the best value for the defence of the nation.

My first concern therefore—and one of the reasons why I was so pleased to be able to address you here today—is to reassure you all that we in the government do attach the highest importance to the need for planning against the possibility of a war emergency, however remote that contingency might appear at the present time. There are, of course, some people who allege that nothing can be done to protect a nation and its people in another general war, particularly if nuclear weapons were to be used on a large scale. This government and their predecessors totally reject this view that the effects of a nuclear or lesser form of attack would be so catastrophic, so destructive and so disruptive that home defence preparations would in practice be of little or no use and therefore could not be justified.

Some people might ask—but not, I suspect, many present here today—in view of what appears to be comparative international stability between the superpowers and of all the efforts being made to maintain world peace, whether we need make any preparations for home defence. My answer to this question is the strongest "Yes, we must prepare". As I have already said, I am not one for dwelling on the past. But if history teaches us anything at all, it is that international situations can change very rapidly and that weakness in defence is no safeguard against aggression. A glance at the news on any day from the Far East, the Middle East and even sometimes central Europe, brings home to us all the precarious balance which we seek to maintain and stabilise.

Until general disarmament has become an enforceable reality, there is no defence policy or foreign policy which our government could pursue at the present time which would give an absolute guarantee that this country

would never be called upon again to defend itself against aggression. We believe, therefore, that it is right, and indeed it is essential, to pay a reasonable premium for preparedness against the effects of war; not only for nuclear war but also for a period of war in Europe with perhaps less destructive weapons. We must constantly review all possible forms of threat which might arise. We cannot escape the fact that it is a joint central and local government responsibility to provide for the welfare of the community in both peace and war. To make no preparations at either level against the possibility of war would be an abdication of responsibility. After all, even the most neutral nonaligned countries make preparations of some kind.

The form of these preparations must, of course, be determined by the nature of the current assessment of the threat. Perhaps the two most significant changes in the past decade have been in the concept of a longer warning period and in the developing doctrine of a flexible response to non-nuclear aggression. This longer period of tension, of weeks rather than days, has resulted in increasing emphasis being placed on the internal security of the United Kingdom as a base for N.A.T.O. reinforcements. It has also underlined the need for smooth transition-to-war measures which can be effectively carried out before hostilities actually begin, with the least disturbance to essential services which would need to continue in what, at that stage, would be essentially a peacetime situation. It should always be borne in mind that situations may arise where the threat of war may fluctuate, possibly over a considerable period of time, and then finally war itself is averted. In such a situation there would be an obvious need for a capability to translate the country progressively from a peacetime to a wartime footing, but at the same time to continue essential peacetime services in the normal way. This sort of situation points to the need to relate war measures, organisations and procedures as closely as possible to their peacetime counterparts and to plan for special organisations only where no other option is open.

In studying the conclusions reached from study "SURVIVAL I" and the papers prepared during the course of the Home Defence Review, I was impressed by the widespread agreement which exists on our fundamental assumptions. These were incorporated in the circular recently issued by the Home Office. You will bear with me if I stress them again. First, however important central government planning may be for the long-term survival and reconstruction of our nation, the immediate and greatest impact on this country is bound to fall on the local authority services. Second, that the provident and effective use of resources by local authorities in the early stage after attack would have a significant bearing on the nation's ability to implement long-term recovery plans. Thirdly, that the extent to which local authorities would be effective in performing these immense tasks would largely depend on the understanding of chief officers and their senior staff of the problems involved and also on the support and encouragement which elected members give in peacetime to those officers to devote time and energy to the essential preparatory work.

For the reasons I have mentioned, we decided to increase the amount available for payment to local authorities. In particular we wished to ensure that the new counties after 1974 and even earlier, if agreement can be reached between the existing authorities, would have adequate resources to enable emergency planning and minimum essential training to be carried out effectively. We considered that, since there was much common ground between war planning and planning for major peacetime emergencies despite differences in scale, there would be advantages in creating a closer relationship between the two functions at the local level.

Perhaps the most important feature of all in the new arrangements which the Home Office announced in its circular in March of this year is the creation of the county emergency planning teams. A great deal is going to depend on the calibre of these teams and on the encouragement they are given by the local authority to develop and co-ordinate emergency plans. The government indicated its willingness to provide three-quarters of the money for these teams. But the effectiveness of their work will hinge on the interest, support and active encouragement they receive from elected representatives and from their own colleagues. The size of these teams will no doubt vary from one county to another and will, of course, govern the speed with which essential planning tasks can be completed in the initial stage. It may be wise to start now with the essential components of the team and only include extra members when the permanent work-load warrants such an addition.

I recognise the tendency, with other pressing day-to-day preoccupations in maintaining peacetime services and in implementing recent legislation, to defer the preparations needed to meet a war situation which we hope will never occur. Nevertheless, I repeat what I said earlier that it is a joint central and local government duty to plan in advance for the provision of essential services for the people in both peace and war.

I recognise that with local government reorganisation there will be some areas in which progress in the establishment of emergency planning teams and the subsequent development of emergency plans will not be easy. I am confident, however, that given good will, much can and, in fact, will be achieved. The important thing surely is to identify what can be done and get on and do it. We should not look for reasons to justify inaction. It was heartening to me to find elected members and senior local government officers contributing their knowledge and experience to the subject of home defence in studies "SURVIVAL I" and "SURVIVAL II". I hope that these and similar studies will continue. They make a valuable contribution in a field in which there is no absolute knowledge or central pool of irrefutable wisdom, and no textbook solutions of indisputable national application. In order to foster opportunities

for an exchange of views which would have an important bearing on the formulation and circulation of policy, you will know that it is the government's intention to convert the central training establishment at Easingwold to a College. We hope that local authority elected representatives and senior local government officers will take every opportunity of participating in studies on home defence matters to be held there. Their contribution, their knowledge and their experience will be vital for the effective development of emergency planning in future.

I am very conscious that to enable county emergency teams to develop their plans it is necessary for central government to maintain a flow of guidance about the operational assumptions on which the county plan should be based. This guidance was promised in the Home Office circular. I can assure you that we shall do everything in our power to keep that promise.

If I may say a word about volunteers—as you know, it was decided not to re-create any special national force of volunteers for civil defence. This does not mean, however, that the government under-estimates in any way the contribution that voluntary services can and do make in providing assistance in emergencies. On the contrary, we are convinced that this valuable support should be harnessed by the local authorities themselves on a local community basis. The way in which this is done may vary from area to area.

It is an important part of the new and comprehensive arrangements for the maximum use to be made of voluntary effort in support of local authority plans. Only local authorities can decide how this effort should be incorporated into schemes of self-help. Voluntary organisations such as the W.R.V.S. and the Red Cross, to mention but two of many, are already involved in existing emergency schemes. The operational units of the more recently formed National Voluntary Civil Aid Service could in future have an equally important role, alongside other voluntary organisations, in support of the statutory services.

When I said earlier that there was no single central pool of wisdom on home defence matters I did not wish to imply that there was no information about the probable conditions which might obtain in this country in the aftermath of any future war, or to imply that home defence policy was developed in a vacuum. Quite the contrary. A great deal of research for both civil and military defence has already been, and continues to be carried out into the effects of and possible countermeasures against a whole range of possible threats.

The reputation of the military research establishments such as Aldermaston and Porton are probably well known to all of you. What is perhaps not so well known is the research being carried out in the civil field either directly by scientific staffs of various government departments or on a contract basis at universities and other research establishments. For a number of years the Home Office Scientific Advisory Branch has conducted research into the fundamental effects of nuclear weapons. This work has been of great value in the development of sophisticated equipment for the United Kingdom Warning and Monitoring Organisation and radioactive instruments generally. It has also contributed significantly to the development of protective factor formulae, exposure regimes, the control of the public under fallout and basic plans for survival economy. Much of the knowledge derived form this research is fundamental to the development of home defence plans by the military, central government departments and other essential services and industries.

As a second example, you may have heard from a previous speaker this morning that the Ministry of Agriculture, Fisheries and Food has carried out a lot of research not only into the direct effects of an attack against this country on our food supply and distribution system, but also into other aspects such as the effect of gamma and beta radiation on food, animal livestock and growing crops. The scientists also keep abreast of similar research in other countries.

Thirdly, the Department of the Environment has carried out study and research into potential damage to and contamination of water supplies. The wartime plans for water take account of the results of these studies.

These are but three examples. Research and studies have been carried out by officials and scientists in very many other governments department to determine the effect on communications, including space communications, transport, power supplies in their various forms, and a great many other areas which have implications for home defence. But we are not alone in this. A number of other N.A.T.O. countries are also engaged in similar research. Some of this is conducted by individual nations with the results being made known to other member nations. Other projects are tackled on N.A.T.O. co-ordinated basis with individual member countries contributing research into a different specific aspect of a particular problem.

There is a continuous exchange of information emanating from this research and study between all the member nations of N.A.T.O. In addition, regular meetings and discussions are held and standing committees exist for a full and free exchange of views and information within N.A.T.O. Officials and scientists from the Home Office and several other central government departments play an active part in these discussions. We in this country have derived considerable benefit from research carried out in other N.A.T.O. countries, particularly the United States. Conversely, much of the research done in the U.K. has proved valuable to other member nations. In many cases, as one would expect, the knowledge gained from research and study in one particular field of activity will have defence implications in other fields. Where this occurs the responsibility for co-ordination of the dissemination of the results of research and study rests, quite properly, with the Home Office.

I am very conscious, however, that in the field of local government there is a vast amount of knowledge and practical experience in the administration of services

for the public. The welding of this practical experience to the results of fundamental research and study is absolutely vital for the development of sensible and effective policies. This union will I hope be accelerated by the facilities at the new College. The wide range of studies to be held there should ensure a free exchange of views, leading to the formulation of policies on which credible plans can be prepared. It is imperative that planning should be seen to be credible to those who will have the task of implementation. It is from a distillation of the views expressed at these conferences and studies that the flow of guidance will stem.

I should stress, however, that there are not, and never will be, once-and-for-all answers to the many problems of home defence. The military have a saying about their hardware "that if it is in service and works, it must be obsolete". Much the same ought to be true about home defence. It is vital that at all times we should have workable plans on the ground, but these must be subject to constant evaluation, up-dating and revision. Home Defence planning is a continuous process. There should always be something better in the pipeline. If there is not, then I suggest we are not doing our job properly.

I think perhaps you would wish me to say a word about shelter. This is the one major field in which we were unable at the present time to meet the main recommendations emerging from the SURVIVAL studies over the period covered by the recent Home Defence Review. The government's view is that for the public in general the best protection against fallout would be in simply constructed refuges in their own homes. Public advice on home shelter and the measures which can be taken to improve the protective factors of ordinary dwelling houses will clearly need to be revised. The requirement for communal shelter would be limited to those, who for one reason or another, cannot in the time available find protection at home. Before protection for such people could be provided, a survey of all buildings, other than private dwelling houses, would be required to determine where the best shelter accommodation exists. This would be an ambitious and time-consuming project and we had to reconcile in our priorities the importance of this work with all the other work which the county emergency teams would need to carry out during the next two or three years.

Bearing in mind the difficulties which would arise in attempting such a survey before local government reorganisation had been completed, the government felt obliged to conclude that it would be wise to defer this project for the present. This does not mean that the government underestimates the value which might be derived from the provision of fallout shelter for those who could not obtain protection in their own homes. I can promise you that the nature and timing of guidance on this important subject will be carefully reviewed.

In conclusion, I think the new arrangements recently announced for home defence give a positive lead to local authorities. They clearly mark the end of the stagnation, the so-called "care and maintenance", of the last four years. Moving from a standing stagnating position is always slow. Acceleration is easier when you have first overcome the initial inertia. There is much to be done now, and the government has indicated its willingness to increase the resources to start the movement. Only you and your employers can decide how far and how fast we progress in the next four years.

In making your efforts, the Home Secretary, who asked me to give you his greetings and good wishes, and I will give you every support and encouragement. ▲

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